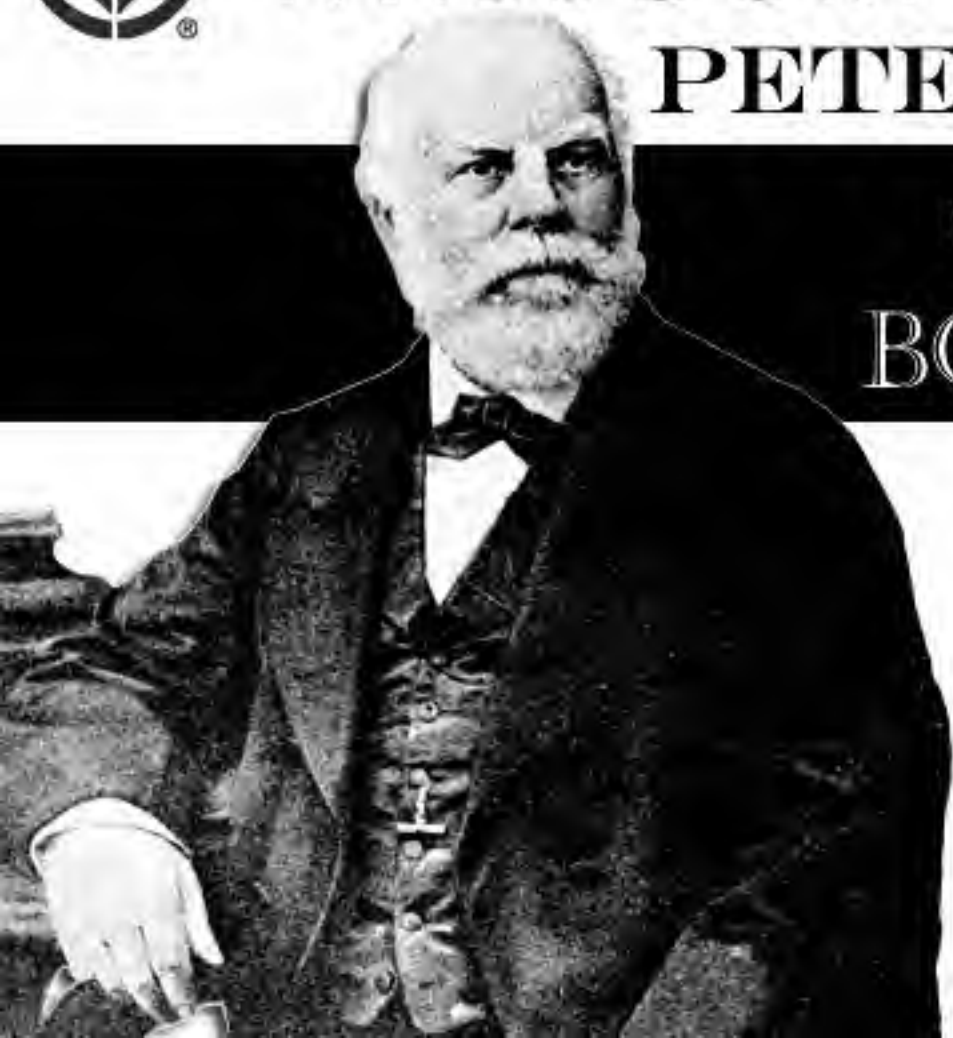




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GEORGE ENGELMANN
BOTANICAL NOTEBOOKS

Pagination Note:

Since many of the items lack a specific page number, the page number displayed online refers to the sequentially created number each item was given upon cataloging the materials.

Scorpaenopsis polyrhiza

July 9 1859

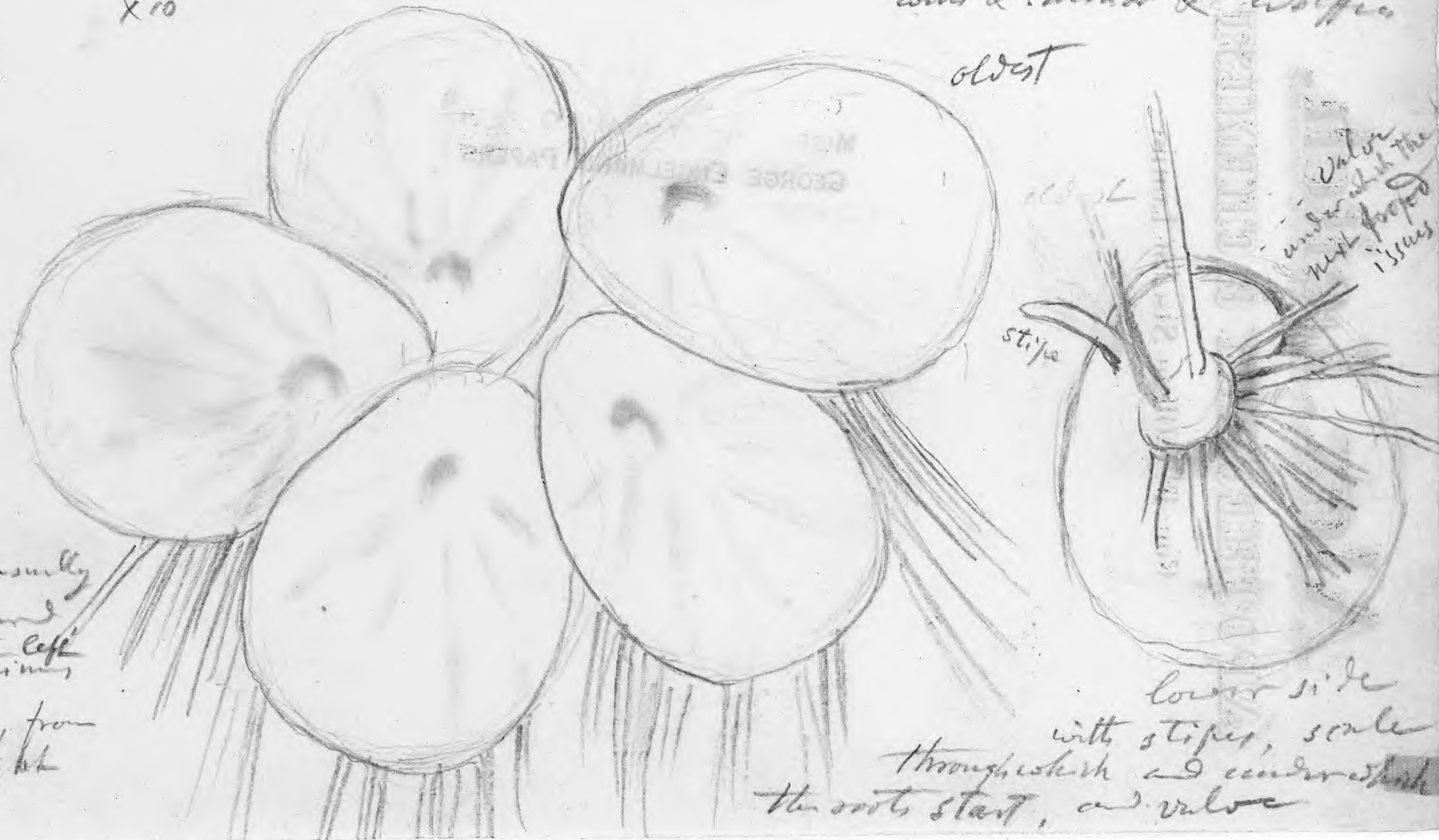
San. Bottom

with *L. minor* & *Wolfii*

X 10

latest

oldest



arrangement usually
as here figured
for light top left
but sometimes
the reverse, from
left to right

lower side
with stipes, scale
through which the roots start, and valve



0 1 2 3 4 5 6 7 8 9 10
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Alex. Leitch,
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Cor. 4th & Olive Sts., St. Louis.

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7792



0

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cm

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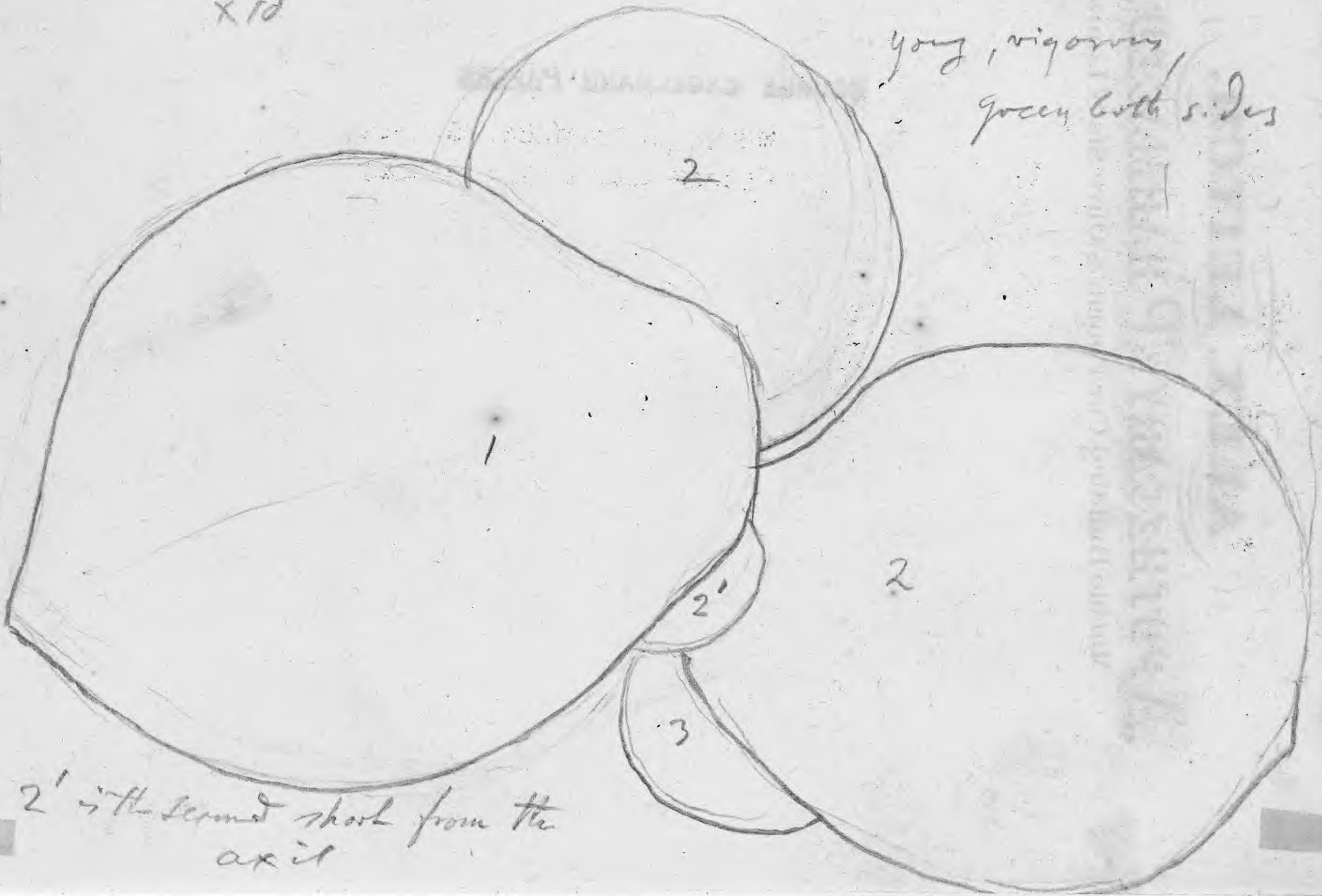
Lemna polyrrhiza

Aug 9 1867

Old Quarries, near Mount, St. Louis

x 10

young, vigorous,
green both sides



2' is the second shoot from the
axil



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cm

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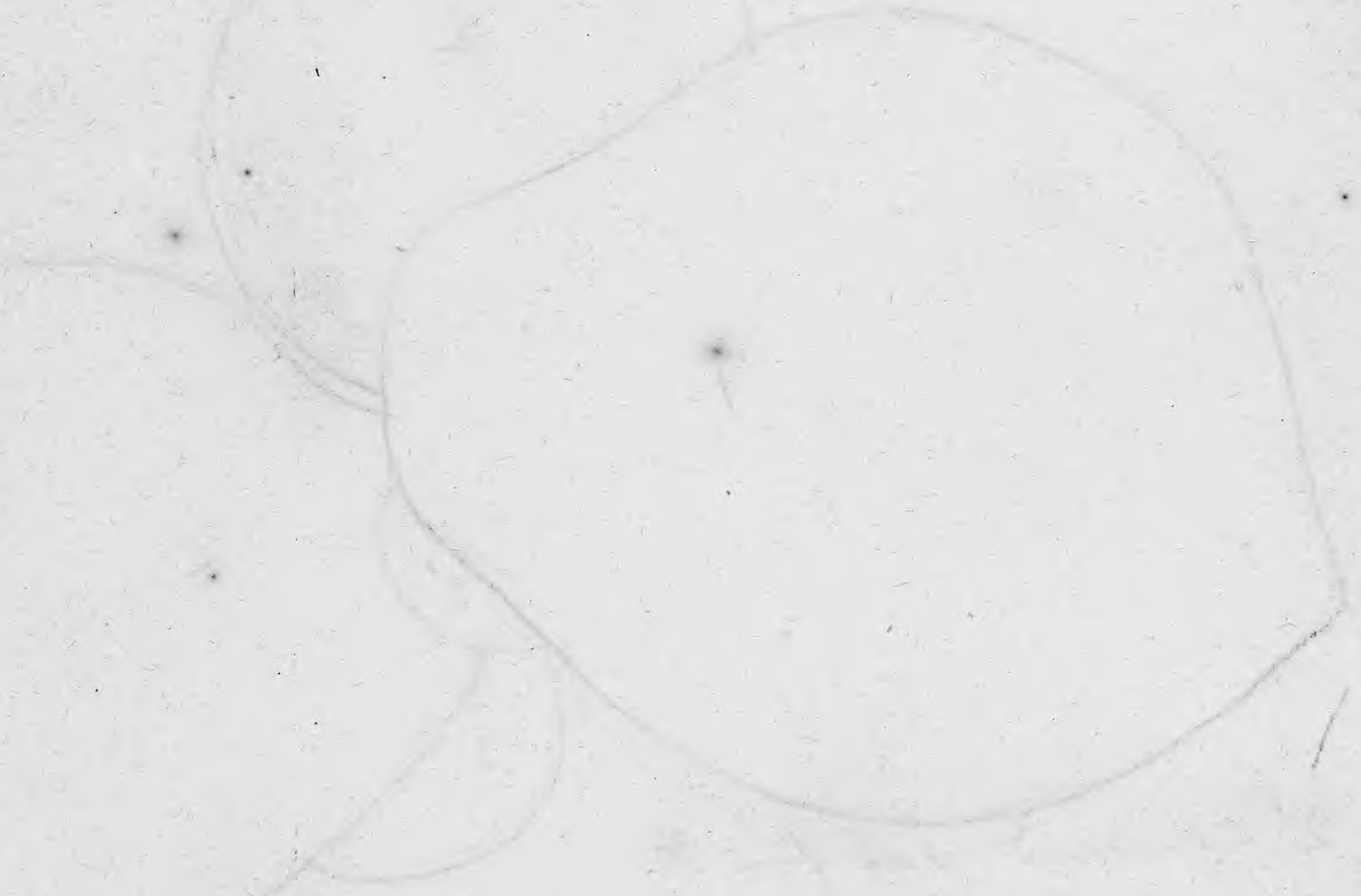
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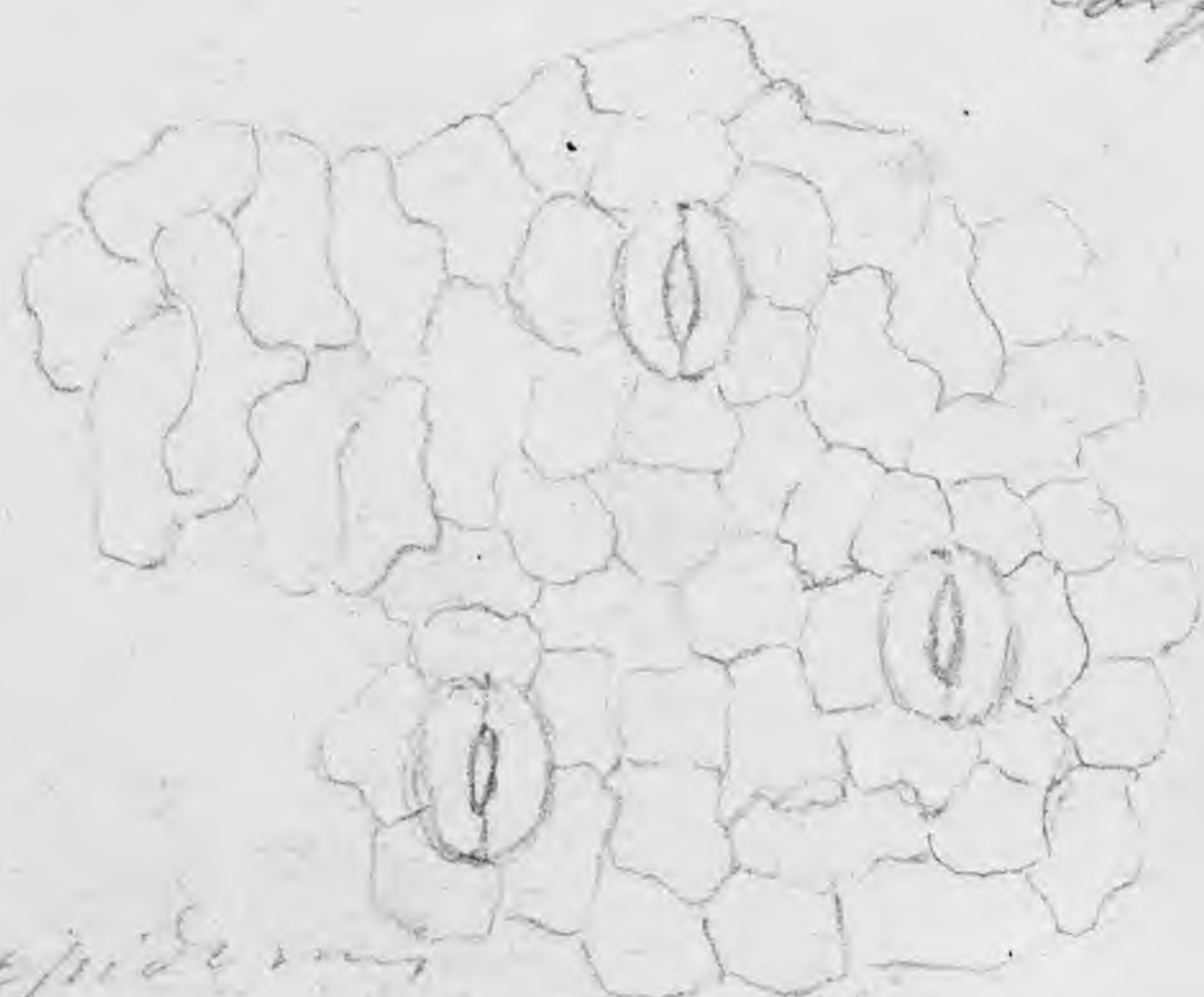
Lemna polytricha

Oct 21 1867

near Solomons creek Sept 26 1857

large, rather thick, flat

GEORGE ENGELMANN PAPERS
x 280



epidermis
of upper surface, cells scarcely sinuous

stomata 0.22 - 0.25 mm

long

(= *Wegelia* figures)

0.20 - 0.23 mm



parenchymatous
cells
and air cavity

one of the
nerves of
the leaf

epidermis of lower surface
cells more sinuous, but in some



places
not at
all so



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20-24

*polyrhiza
fertilis*

New York
Wm H Leggett
1870

84

be followed with tubercle. . . . I might carry the practical good accruing from these experiments much farther, but for the present I must content myself with this imperfect and hasty reference.

Editorial.

SURGICAL TREATMENT OF DISEASES OF THE UTERUS.

We take pleasure in publishing, by request of Prof. Pallen, the following interesting letter from Dr. Cabell, the distinguished Professor of Surgery in the University of Virginia.

UNIVERSITY OF VIRGINIA, October 22, 1868.

PROF. M. M. Pallen, M.D.

My Dear Sir,—I have received your communication in which you request me to answer the following questions:

“1st. What are your (my) views as regards surgical treatment of diseases of the uterus, such as retro-flexion and ante-flexion, as proposed by Dr. MARION SIMS?”

“2d. Are such operations as sections of the uterine neck ever required?”

Presuming that you have been induced to ask for my views in con-



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Editorial.

were introduced into the general circulation through the jugular vein. He says that he was much struck with the rapidity with which death ensued,—all dying within a week or ten days after the operation; and in some were found tubercula, in which the *cheesy* matter had been placed, and vice versa. The results of this experiment led him to conclude that there was something more than what was contained in the tubercle, or in the cheesy product, that increased the rapidity in the production of the same. He therefore opened the jugular vein, introducing *nothing*; but merely closing it as before; the animals all died. An examination was made, and both tubercle and also this same cheesy production were found. Here we have tubercula, the result of *irritation*; and this is the starting point in negating the specificity of tubercle.

He now began a series of experiments with foreign bodies which act as irritants. He introduced gutta percha into the abdominal cavity, as he had done the tubercle and the cheesy matter before; the result was the same, the animal living about as long as those in which the above experiments had been made: tubercle was found in the abdominal viscera, as also in the diaphragm and lungs. An examination of the foreign body gave the following:—the gutta percha was found encapsulated; on the inner face of the capsule were found small proliferations of the lymphatic vessels which



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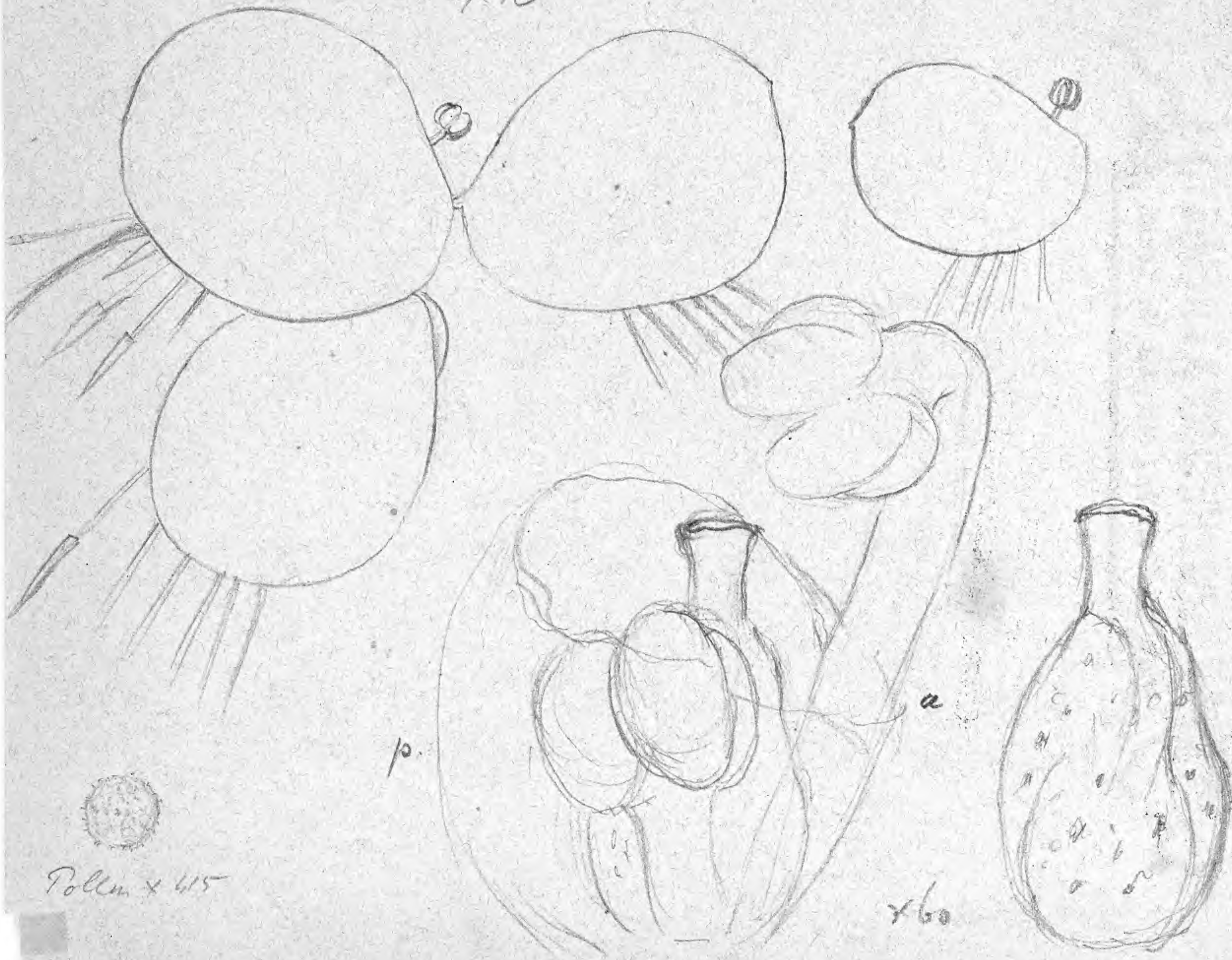
Senecio polyrrhiza

N York, W. H. Leggett. Aug 1870

Aug 19

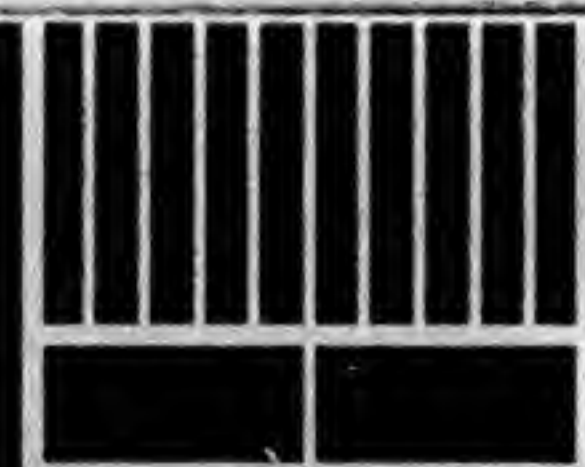
1870

x 10



Pollen x 615

x 60



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cm

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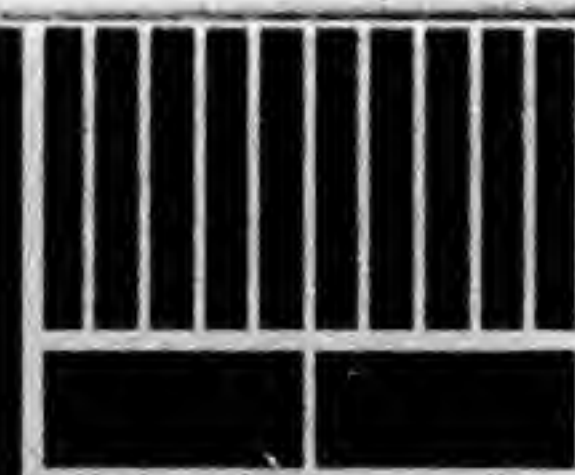


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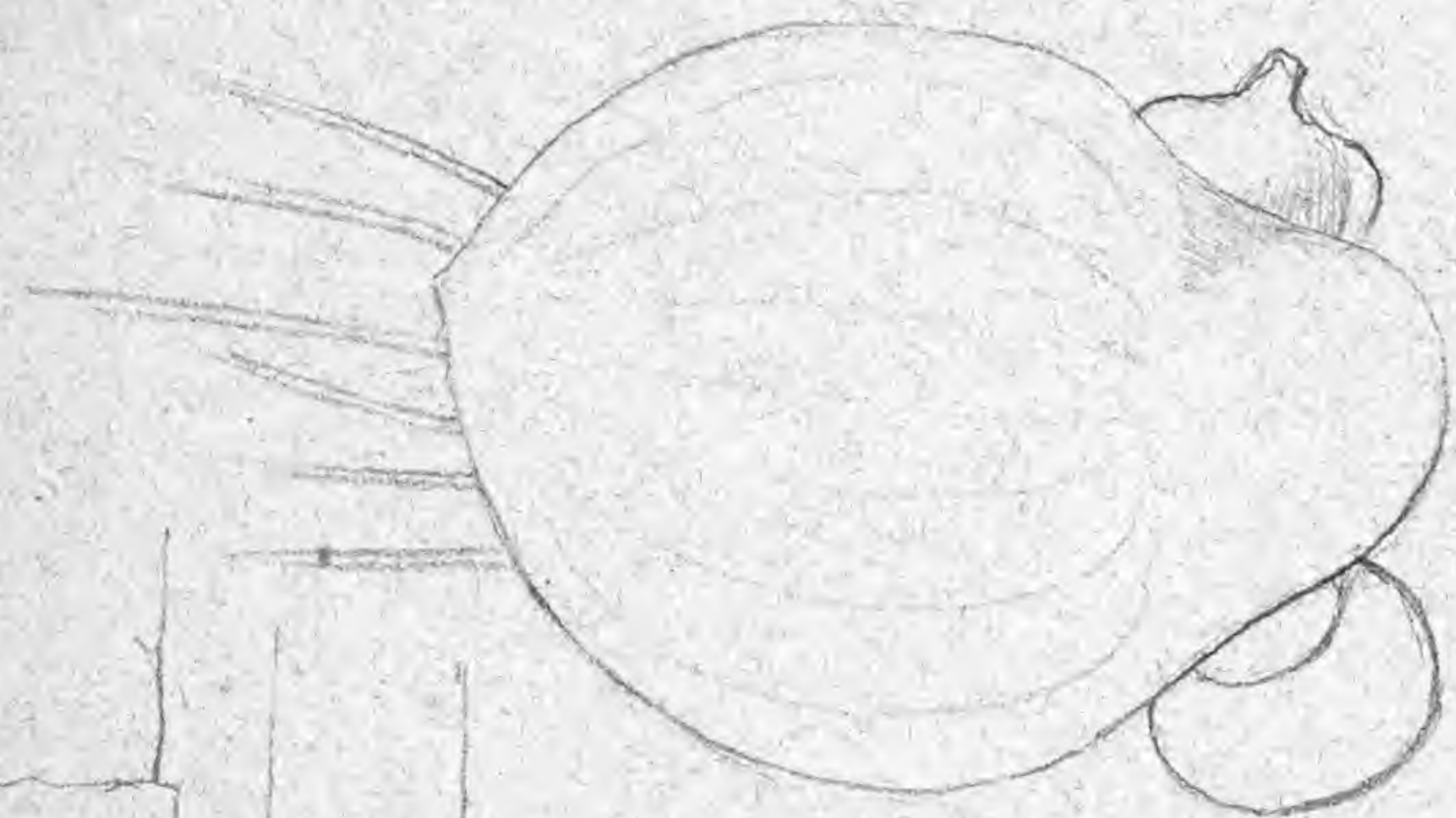


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Lemna polyrrhiza Sargent, N York
Aug 1870

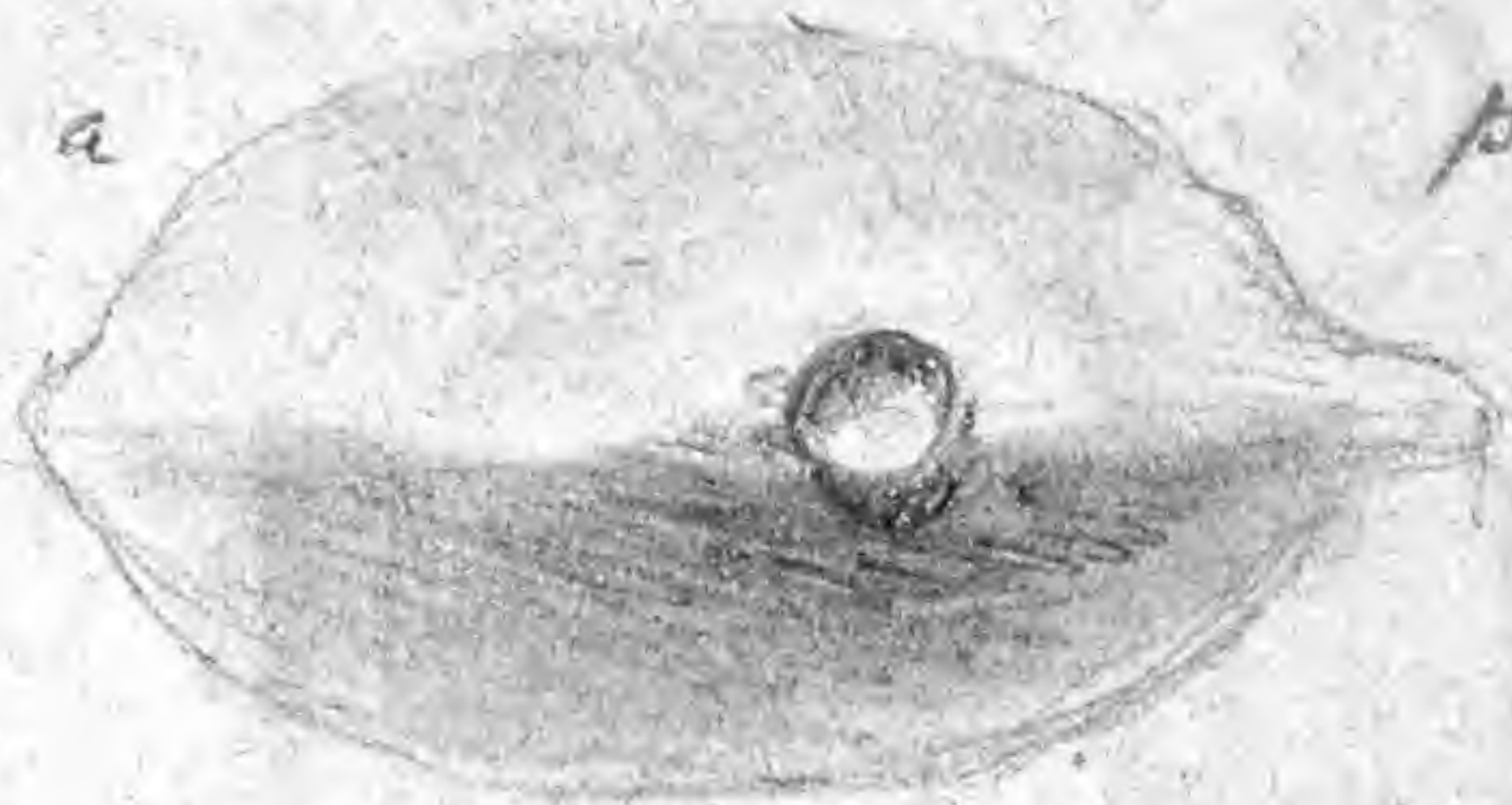
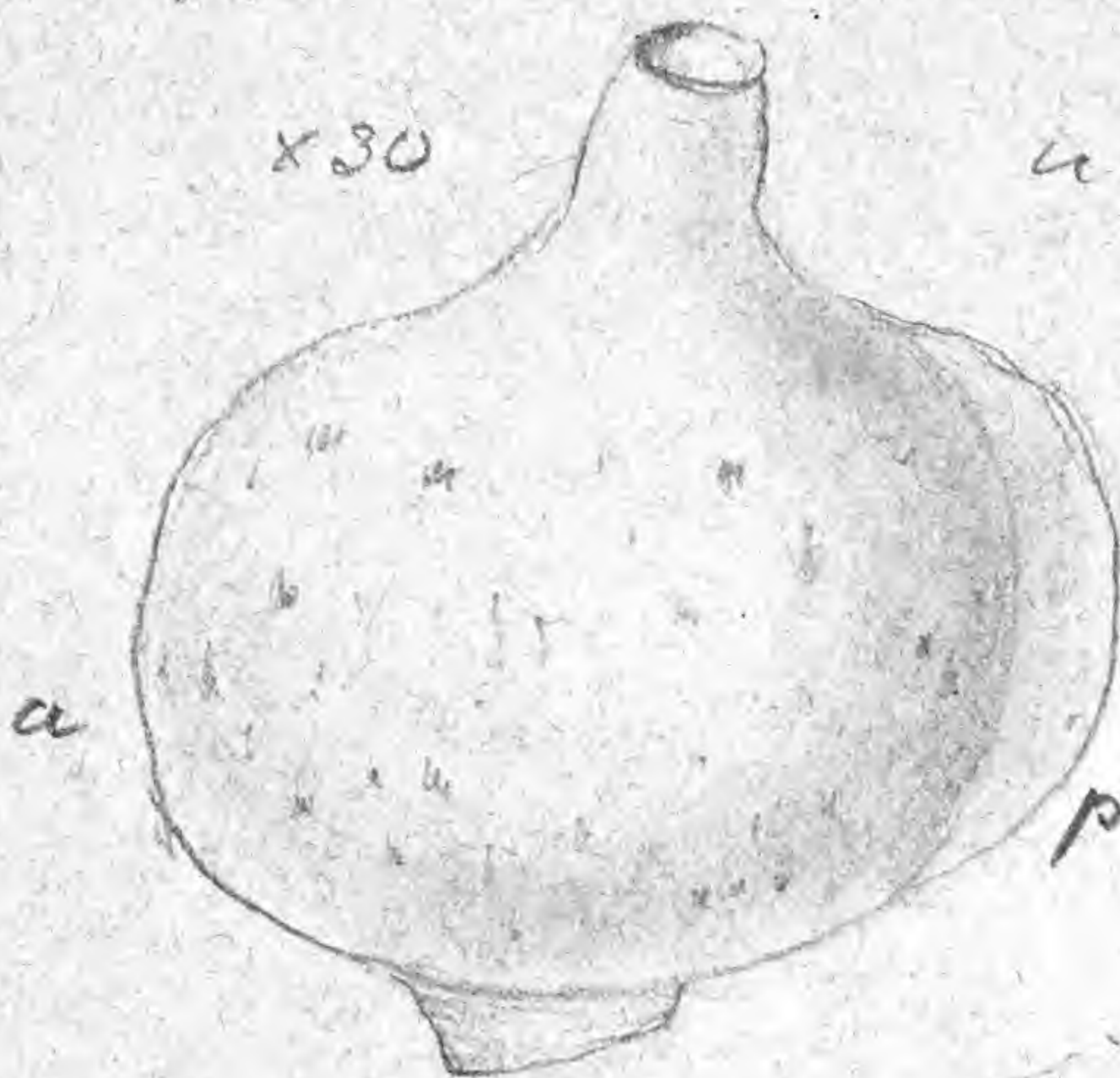
Aug 16-19 1870

x 10



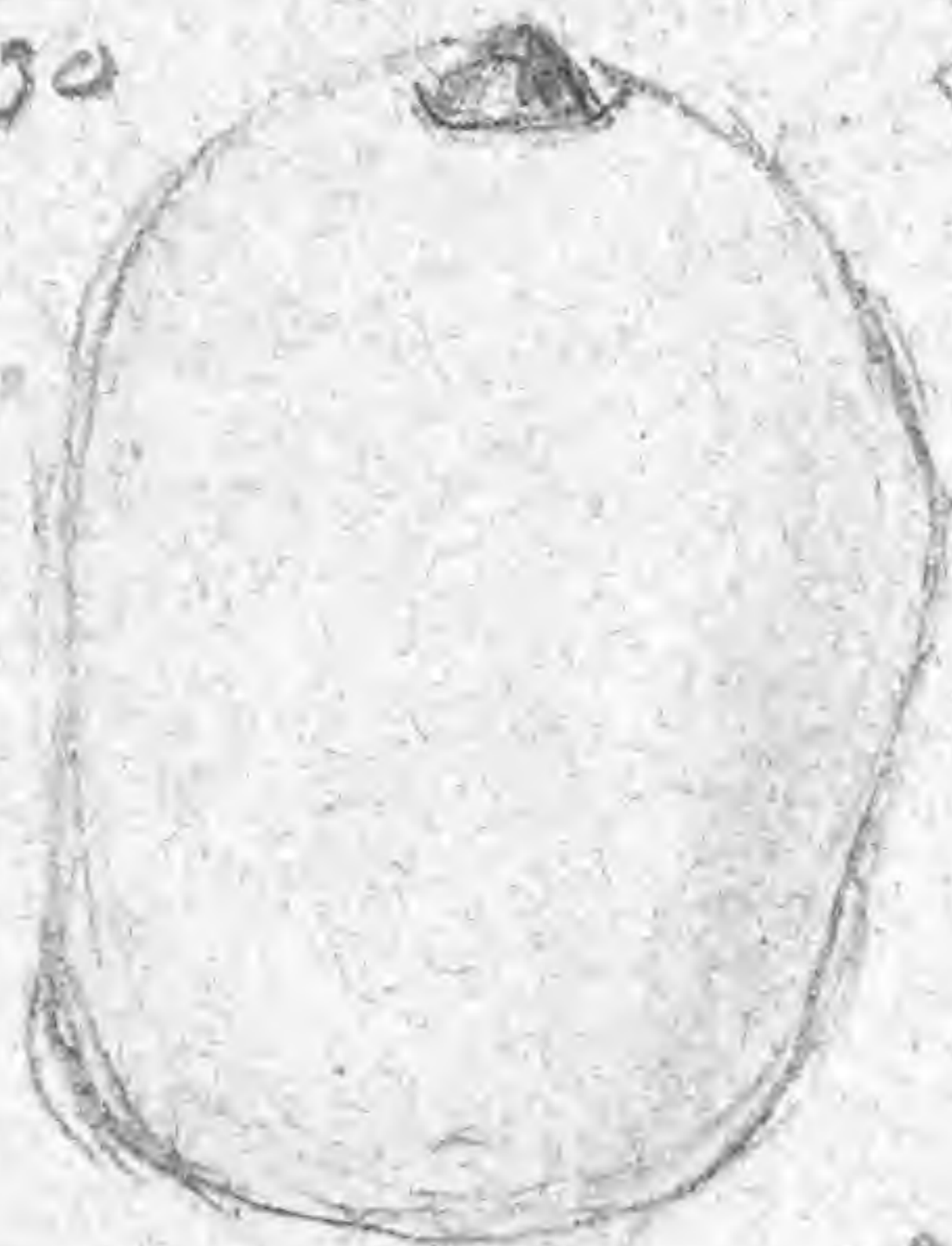
x 30

unripe fruit

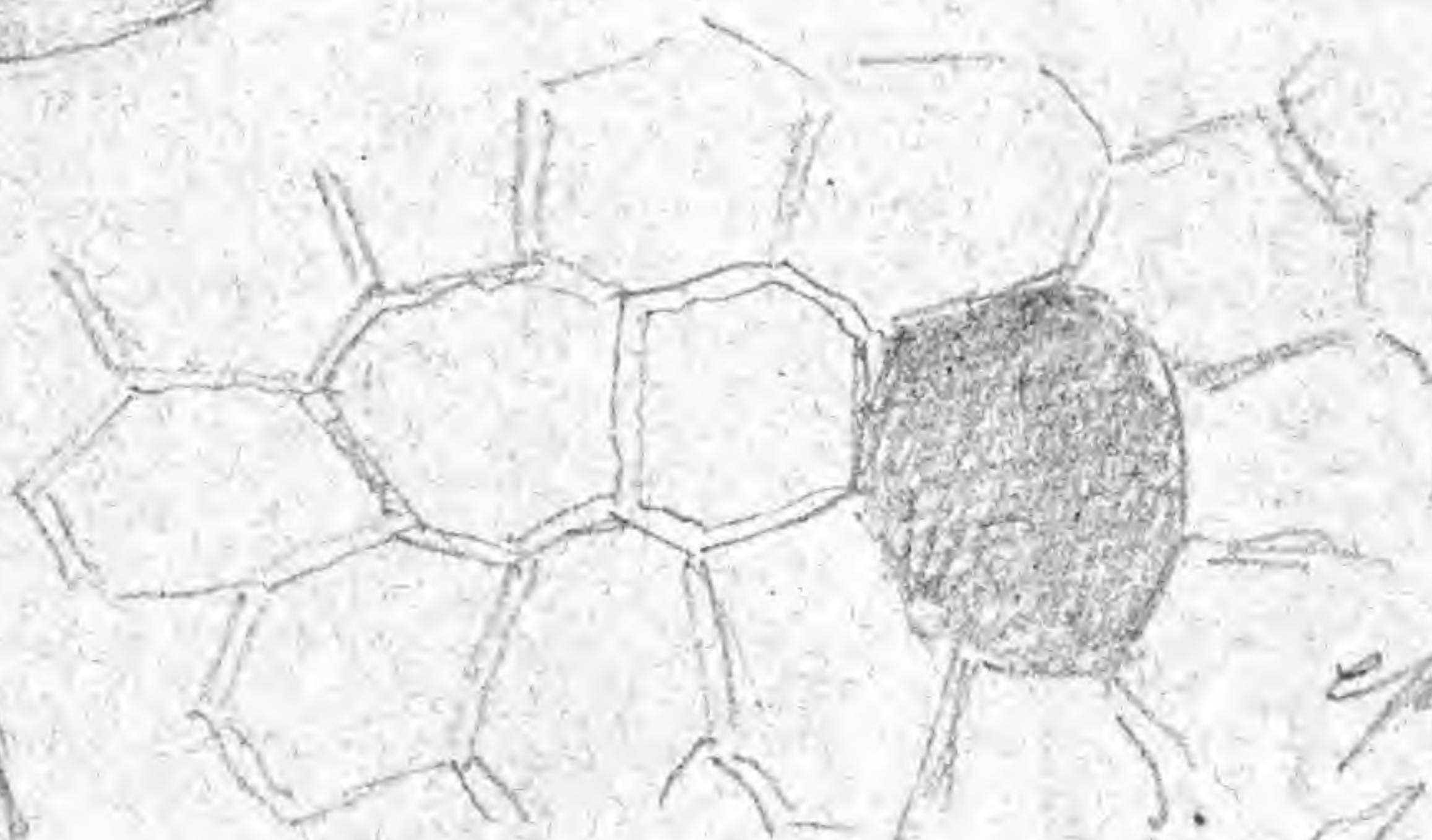


x 30

chalazae



unripe seed



epidermis
of fruit
x 280

stomata
0.14 - 0.16 mm long

upper - lower
epidermis



x 280



x 20

Part of the epidermis of the Lemna polyrrhiza

x 280

parenchyma
of root with
spiral vessel

x 60

root & sheath



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cm

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Lemna polyrrhiza, Leggett, New York Aug. 1870

Aug 21. 1870

all figs

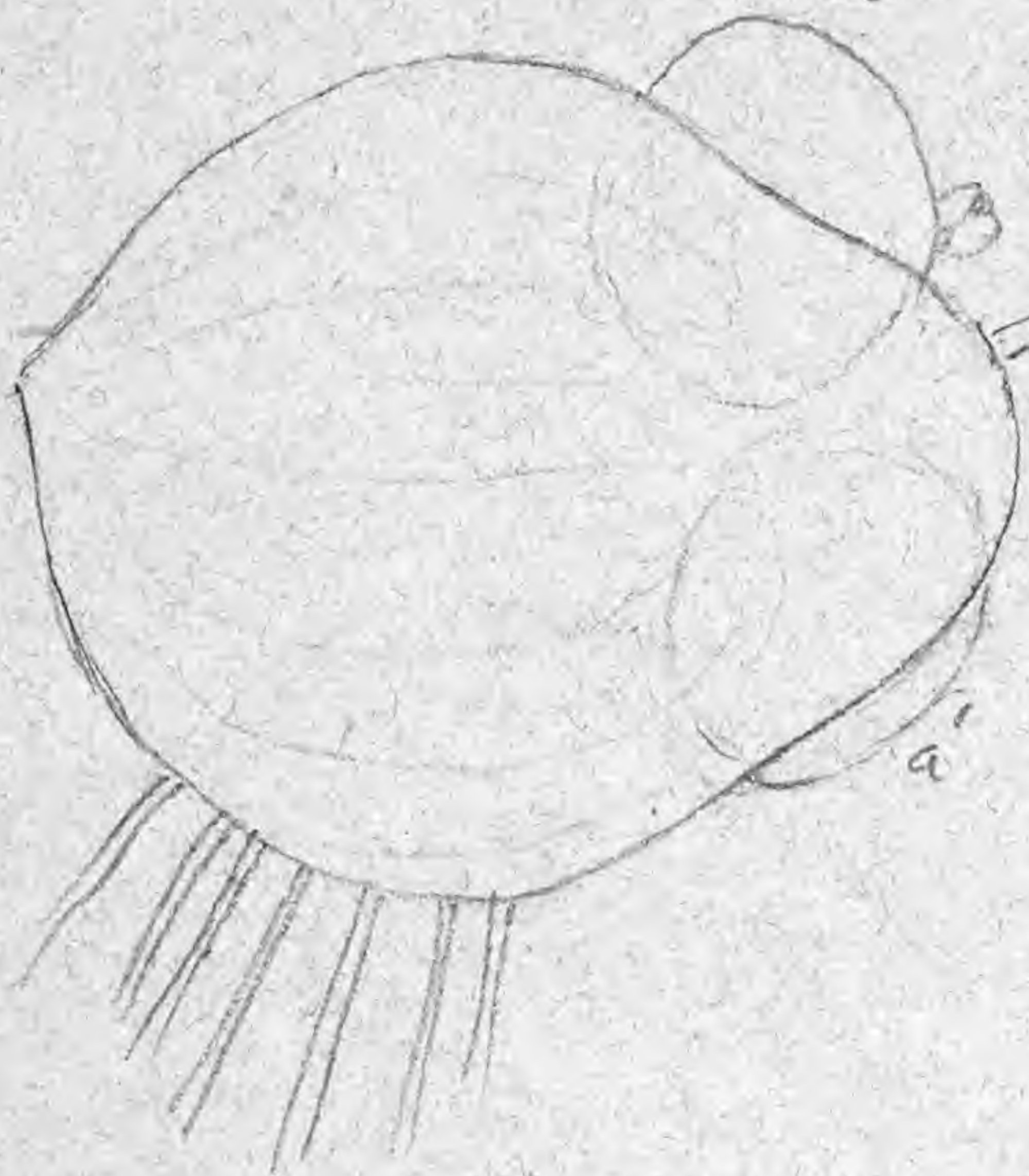
x 10

a winter ponds

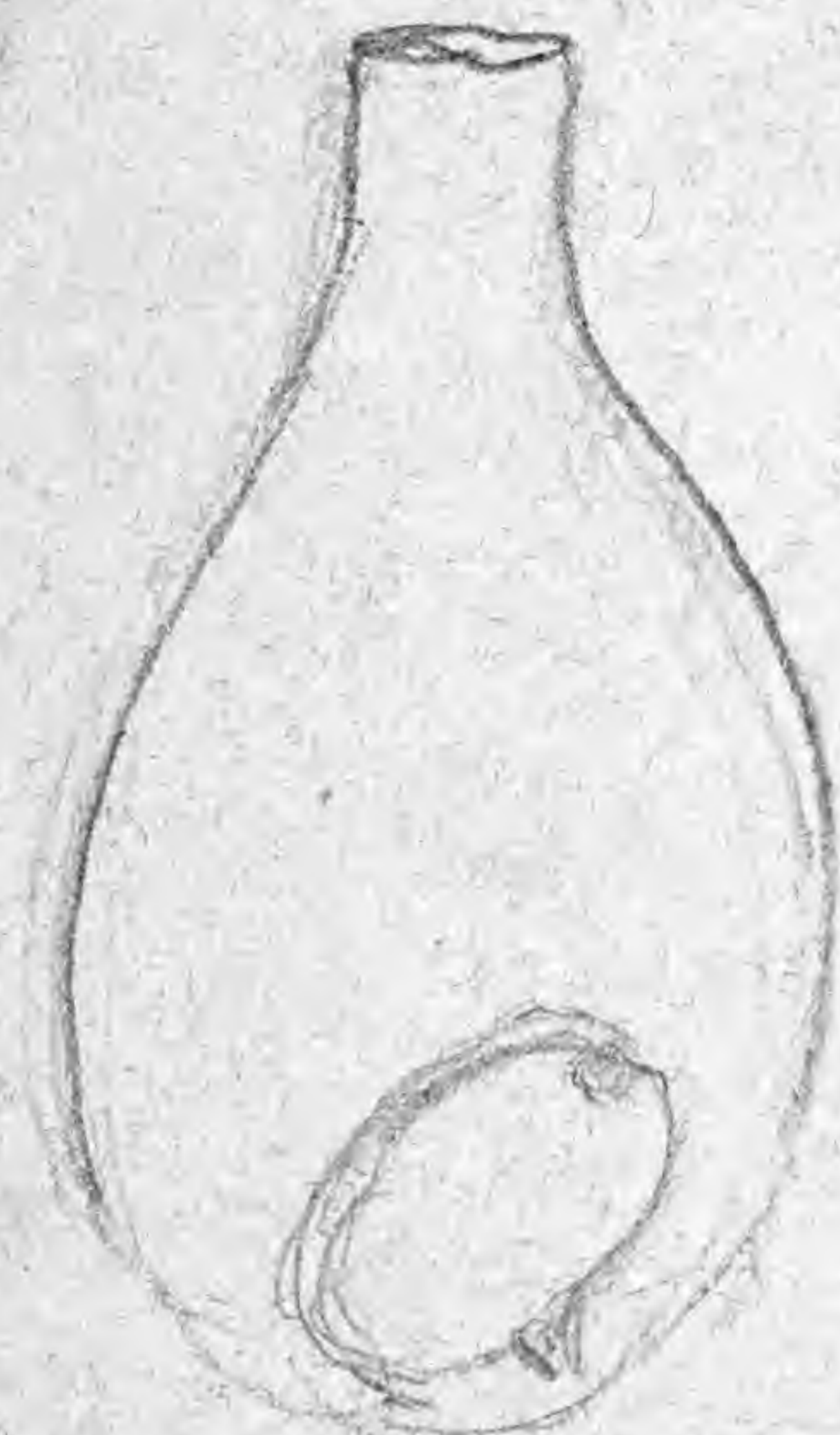
flowers under it & behind it

stem

anterior stamens



young fruit



stamens under pistil



p

a

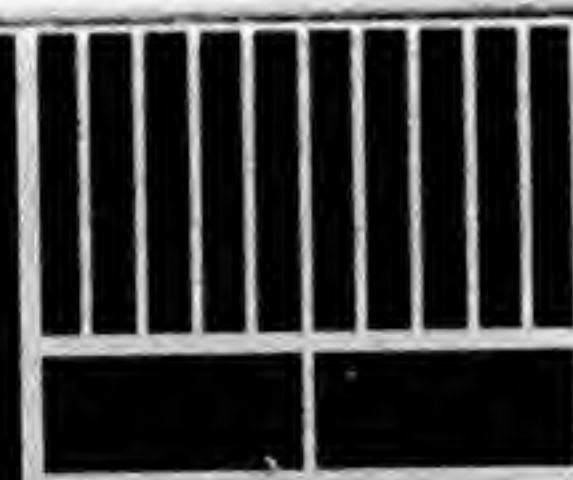
usual case

seen once

drawn from memory

a anterior

p. posterior



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cm

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L. polyotiga
Laggett, New York, Aug '70

Nov 5

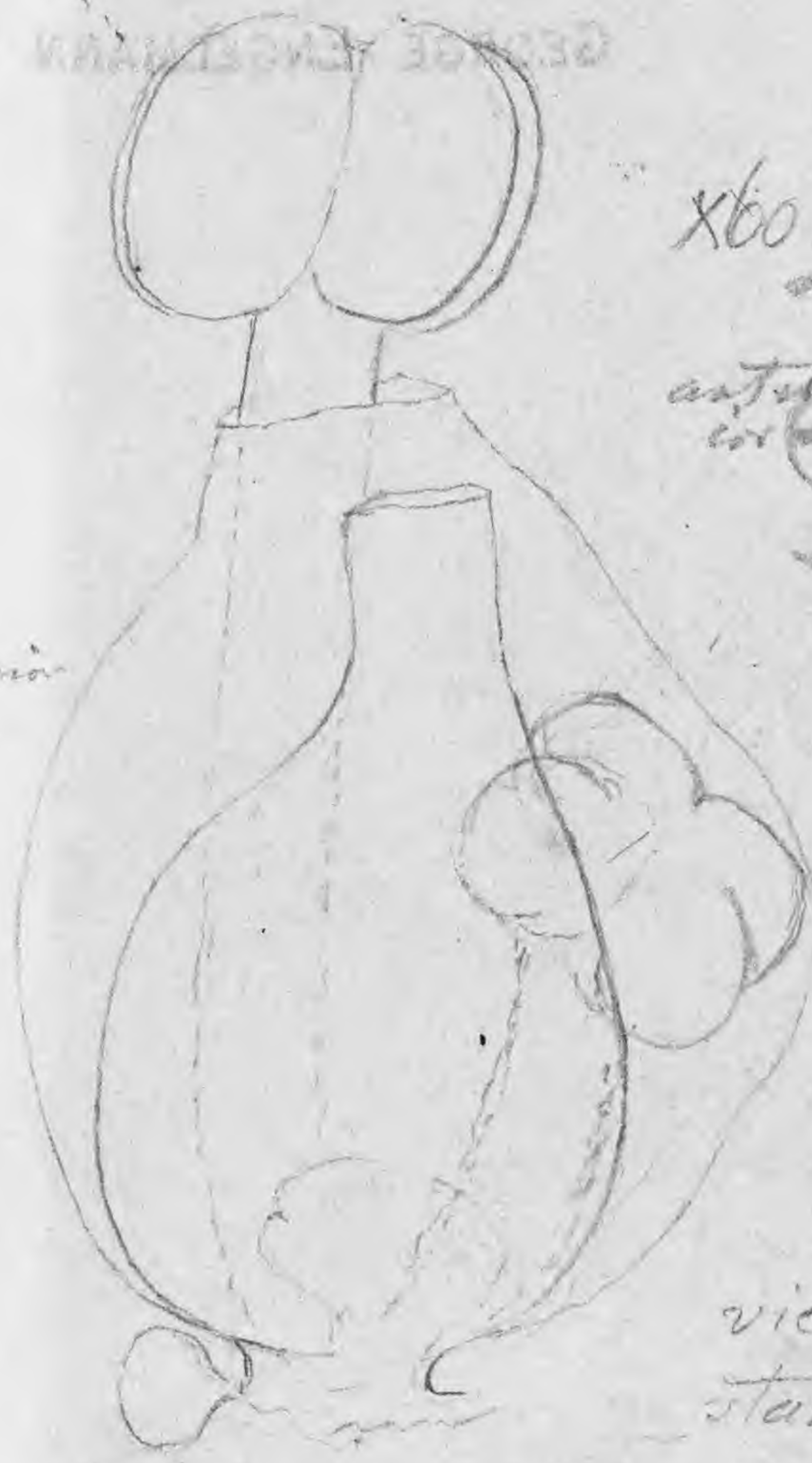
1870

x 10



only 3-5 roots seen
apparently sometimes two
perforating the leaf

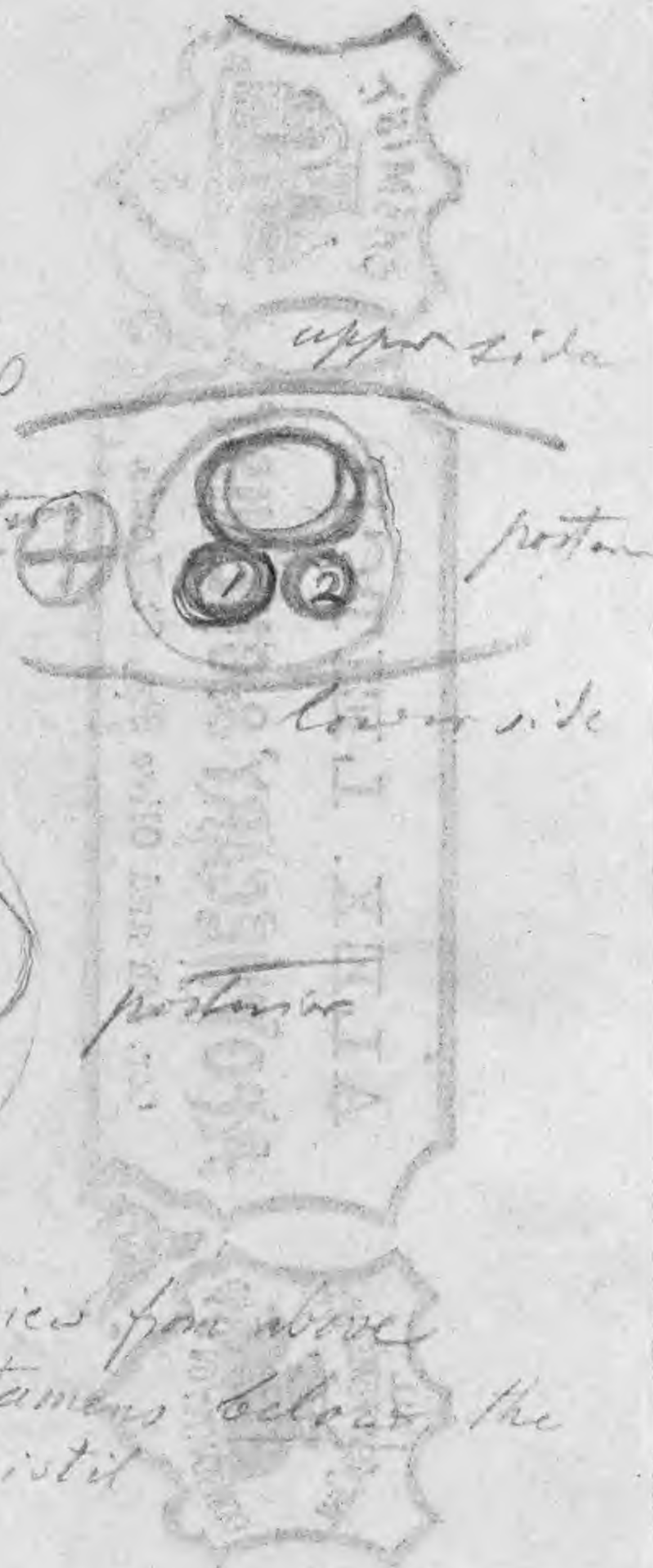
anterior



moles

x 60

anterior



upper side

posterior

lower side

posterior

views from above
stamens below the
pistil



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cm

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BOTANICAL C

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Lemna polytricha

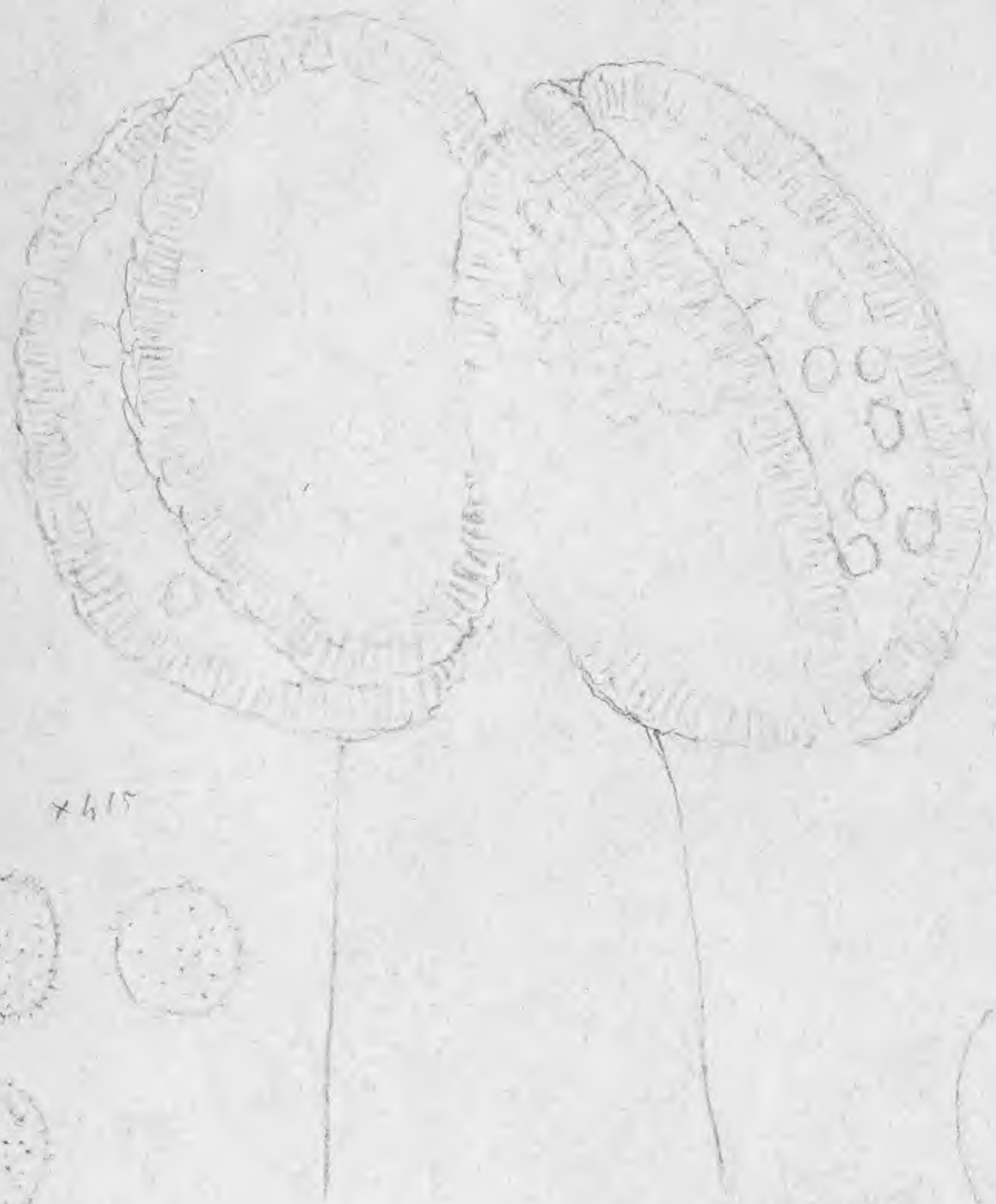
Nov. 6 1870

N York

x 150

anther cells longitudinally dehiscent

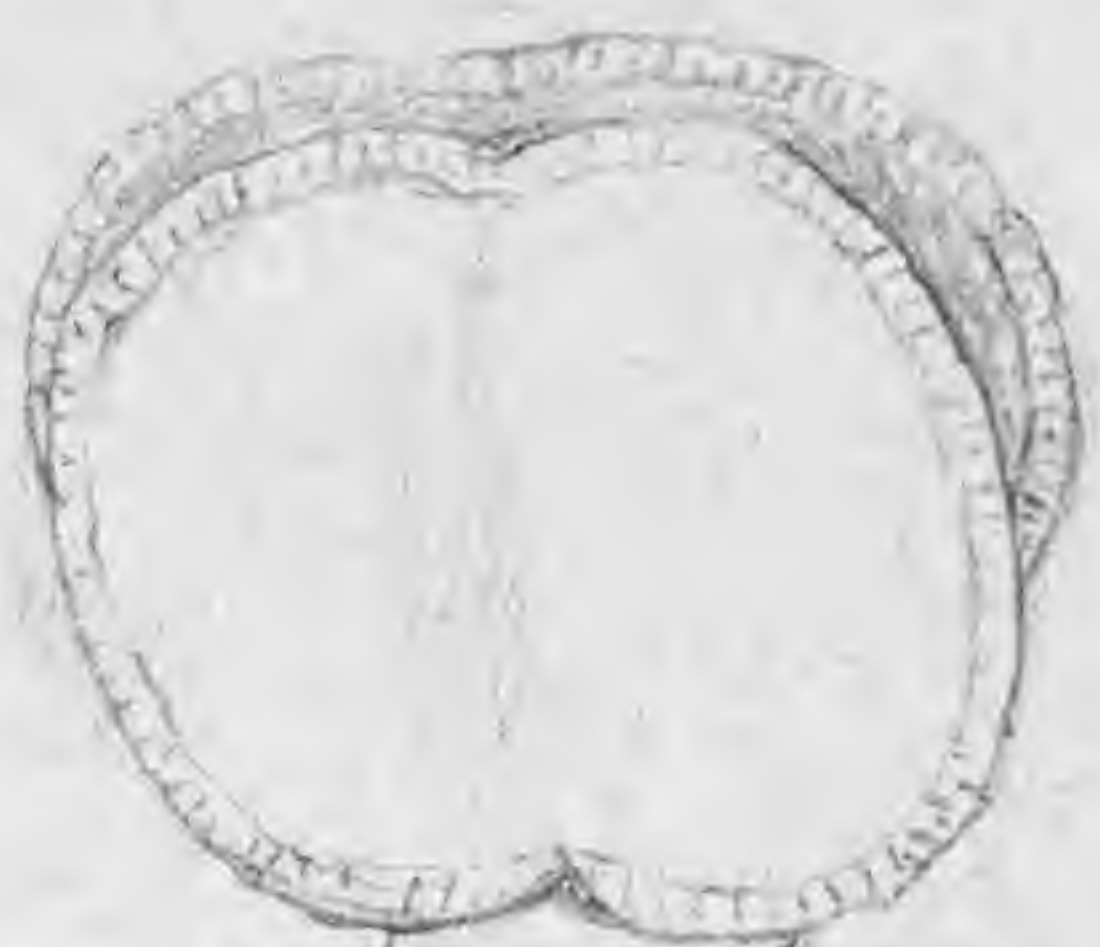
x 60



x 415



Pollen oval or globose
 globose 0.019 - 2.
 oval 0.018 x 0.020
 x 0.019 x 0.022



upper

x 60

lower side



lower side of anther



ovule
x 150



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cm

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Lemna polyrrhiza

New York, Lyggett

Nov 8th 1870

x 150



x 10



upper edge turned open
so as to see lower valve
of pocket & flowers

4 fls with purple
ovules

x 150



ribs of stem 5-6-7



x 60



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cm

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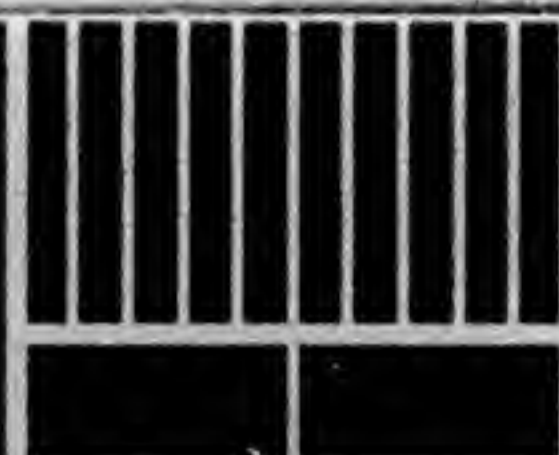
7801

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cm

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L. polyachne 11 9 1870

chalaza Nov 9. 10' 1870

x 60



young, unopened anthers, 2-lobed
both cells very deeply separated

surface of seed
somewhat reticulated with
convex cells, when moist

x 150



embryo



chalaza

x 30

endosperm
section
endosperm or albumen
testa thick

1870
Better Nov 13'

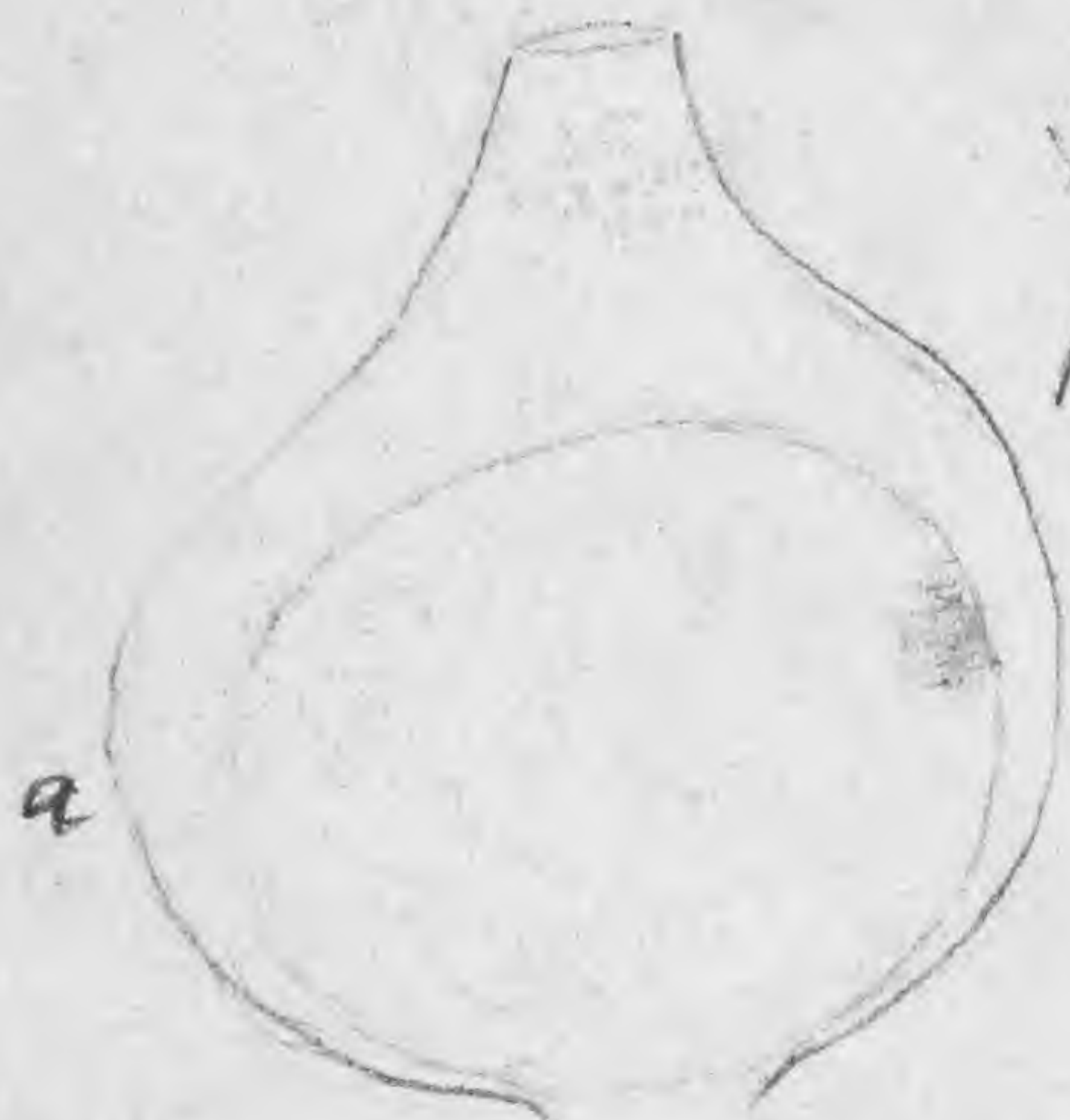
section of
seed
through
middle



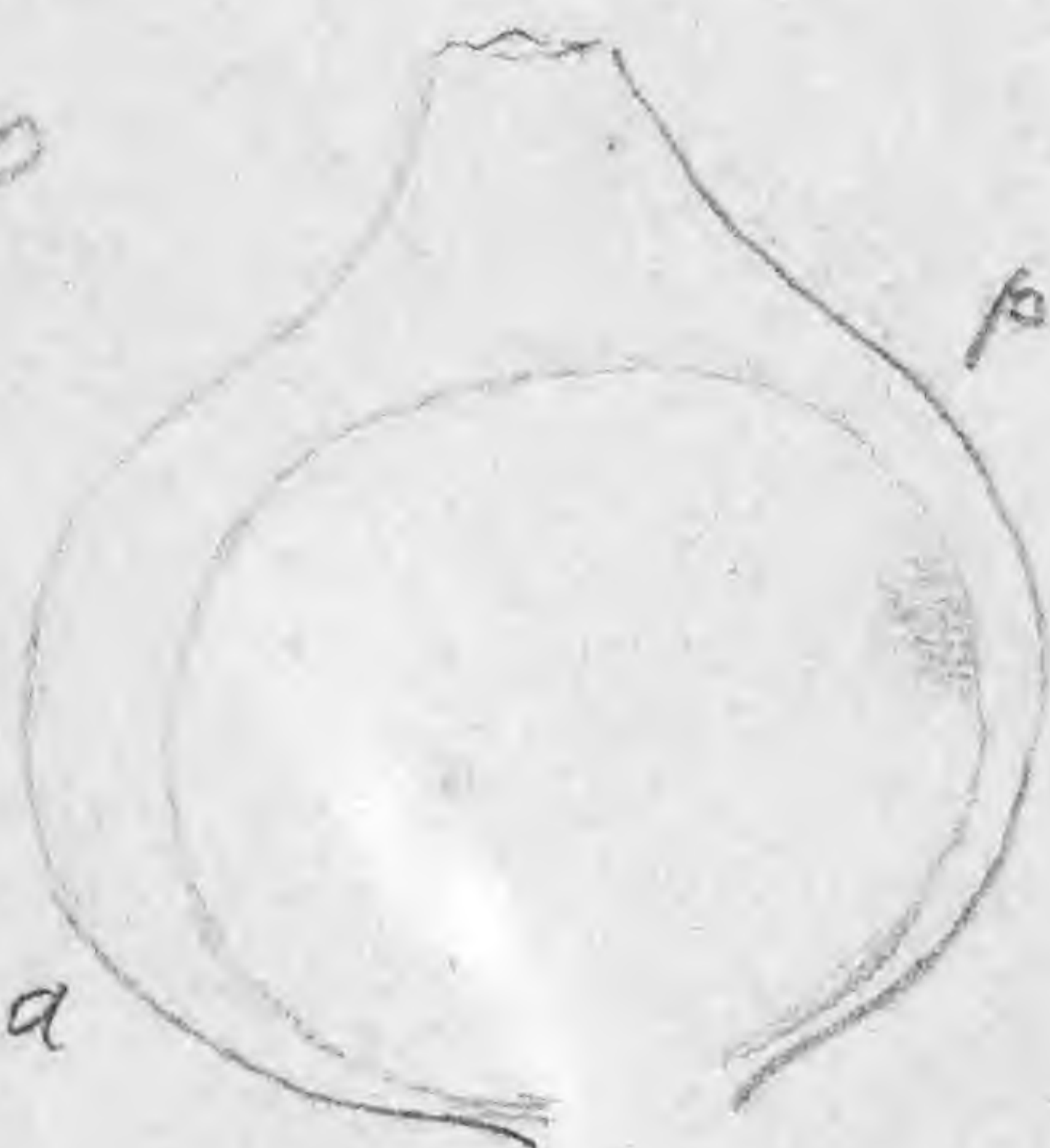
no iodine
reaction
only middle part
coloured darker
and especially
its brown membrane



action
of iodine



x 30

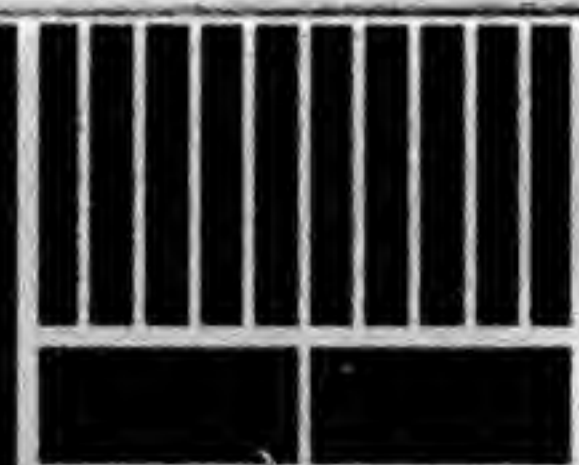


utricle with seed, in alcohol
p. posterior
a. anterior side



under side
of dry seed
showing the chalaza
(hilum) & raphe

Dark spot on seed is the chalaza
always posterior



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cm

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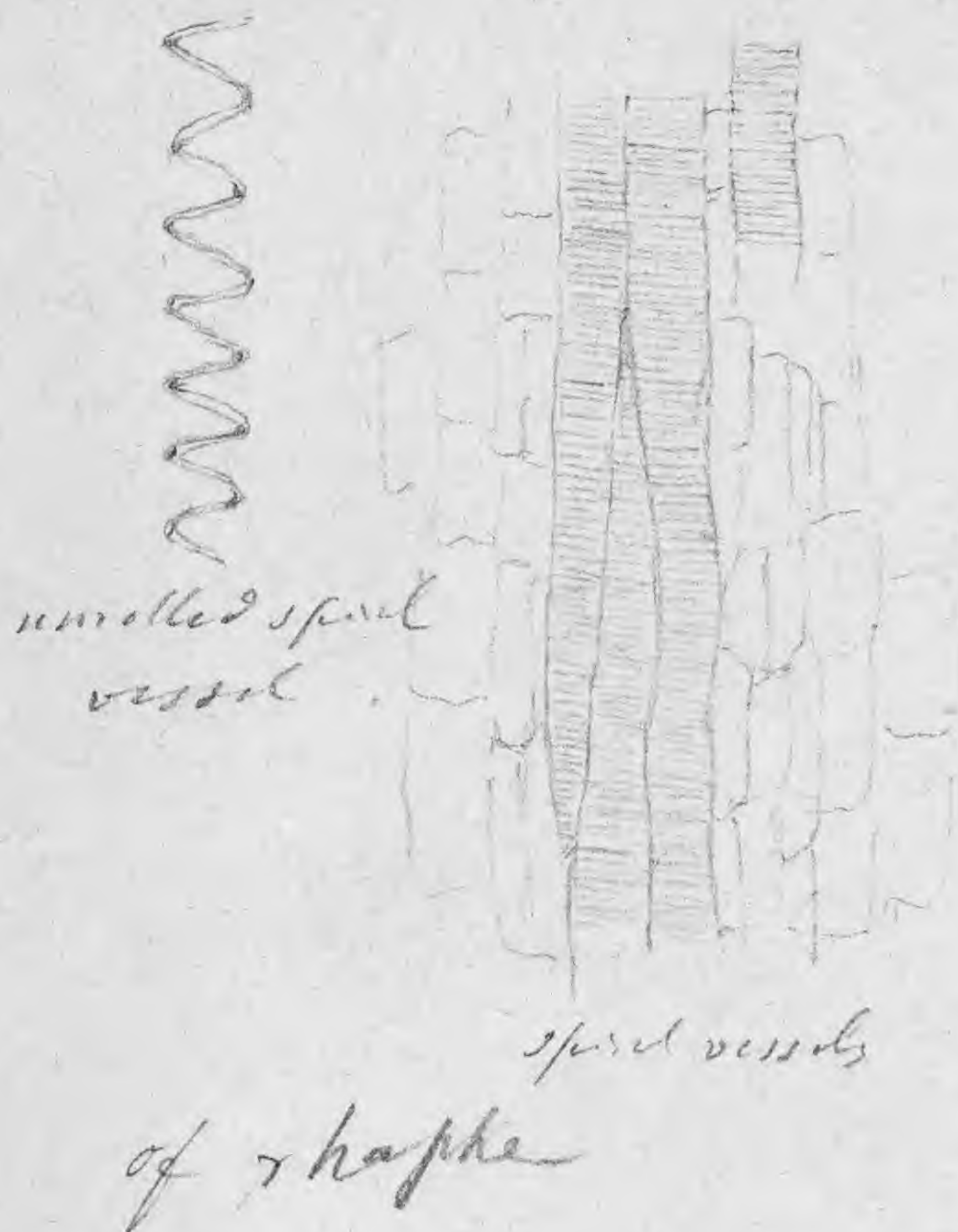
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x 280

Sporobolus polytrichus

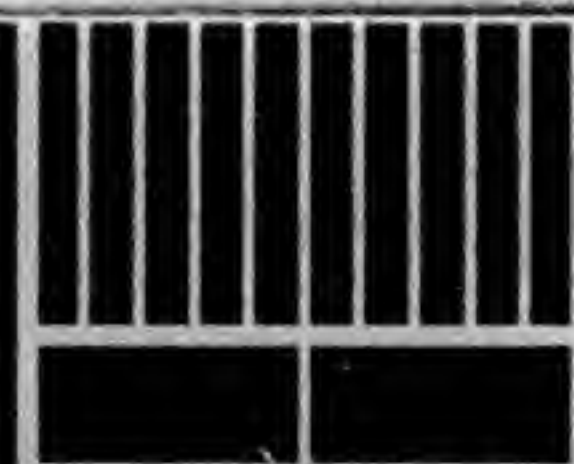
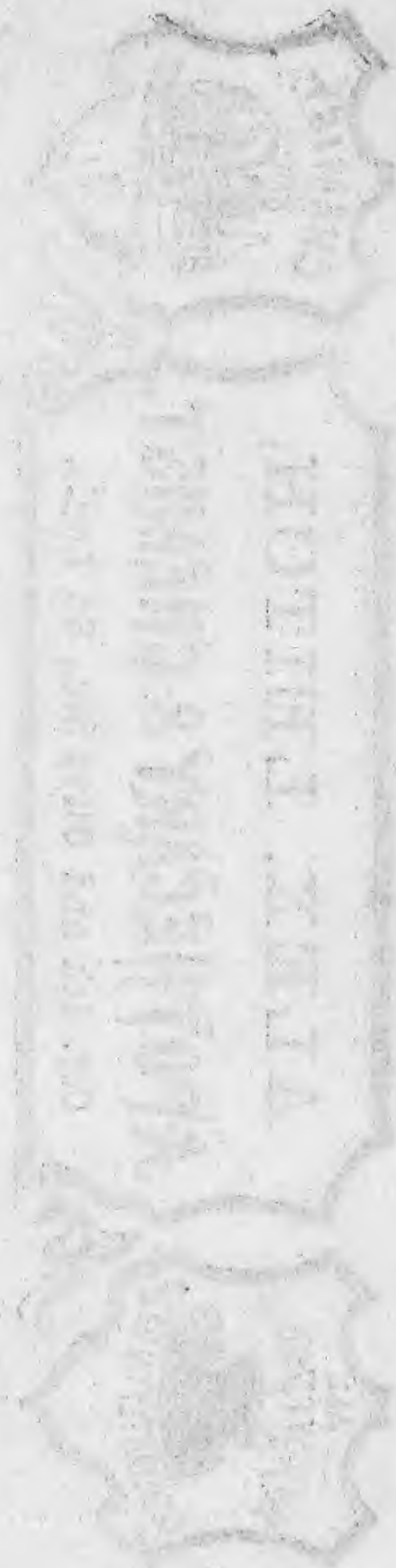
Nov 11 1870

New York



Is this really from the *Sporobolus*?
I could not find it again! Nov 13

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DEPARTMENT OF BOTANY
UNIVERSITY OF CALIFORNIA



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cm

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Nov 13 70

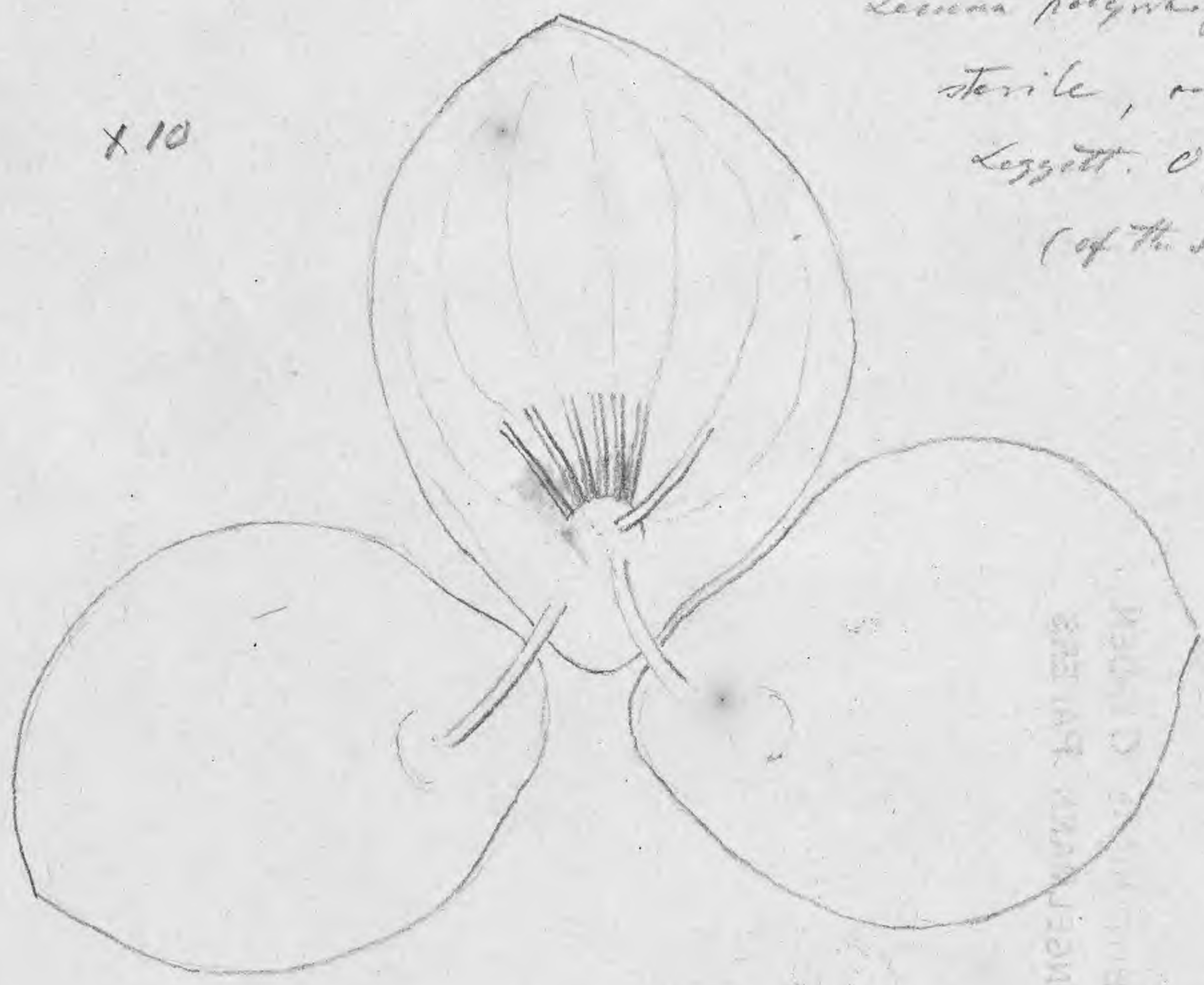
Lecanora polytricha, New York

sterile, cultivated in Room

Leggett. Oct 1870

(of the same lot, that
flowered in August

x 10



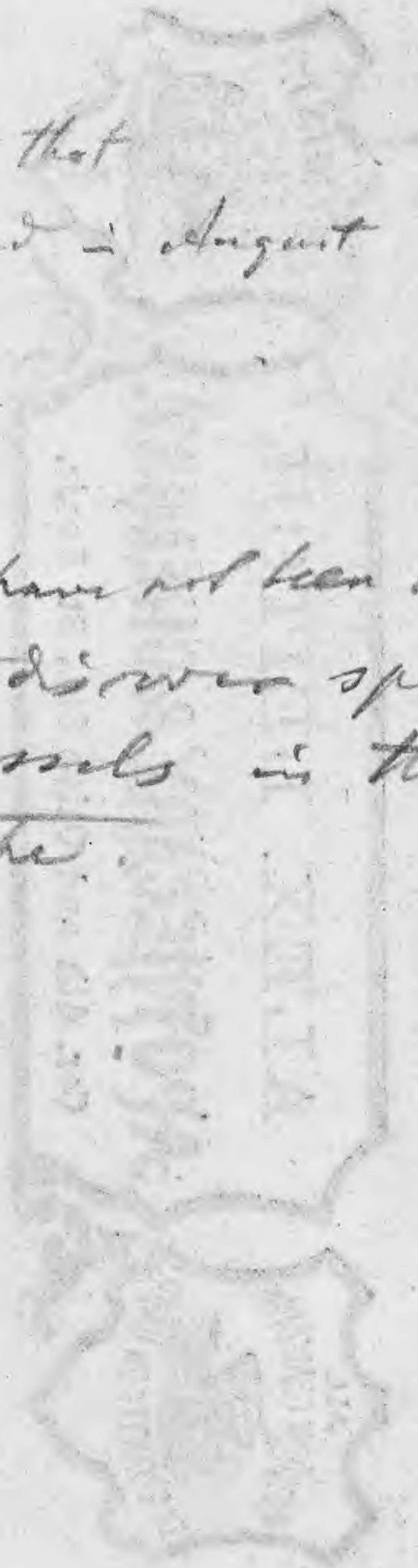
I have not been able
to discover spiral
vessels in the
stipe.



Strophodes crystal masses
both in the cells
of the subcuticular
tissue

(n

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IN THE BOTANICAL GARDEN



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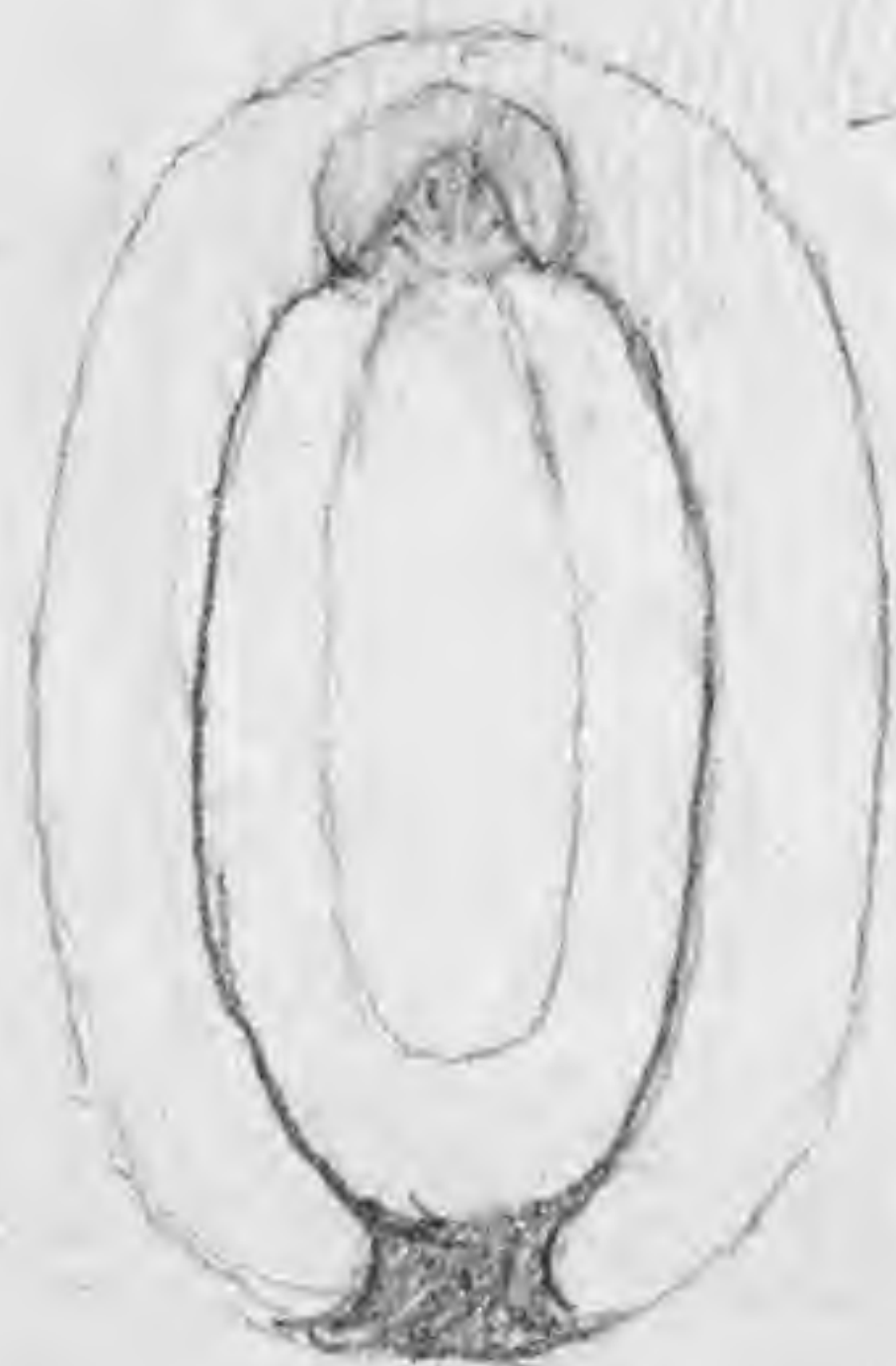
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Lecane polytricha

13 Nov 1870

x 30

N York
seed, nearly ripe



cavity in which
operculum is
hidden

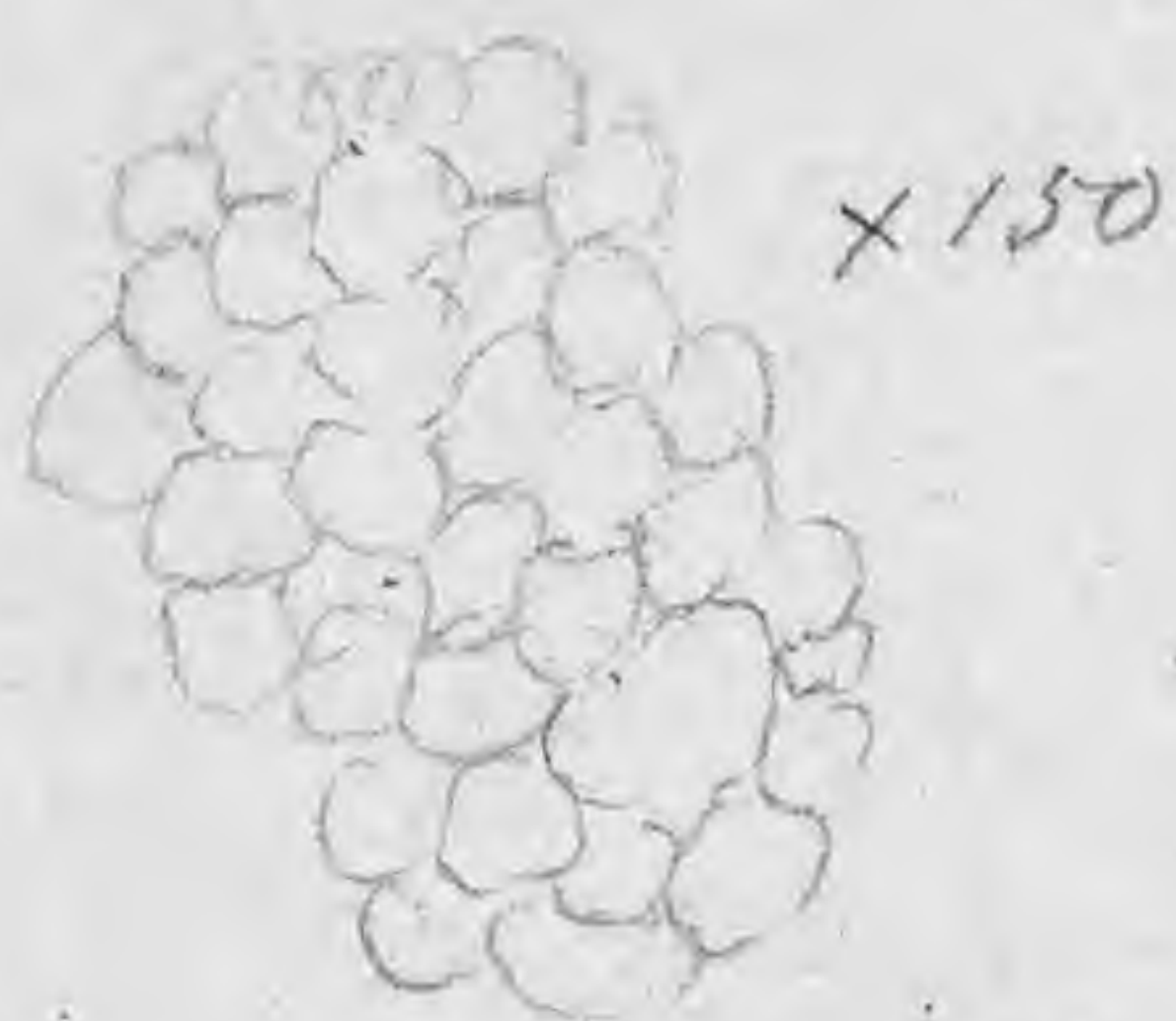
good opportunity of
examining raphes
but no spiral vessels
discovered

testa very thick and
spongy

endopleura a brown
membrane

endosperm or albumen
rather large, thick,

embryo - no divisions
(plumula etc) seen
not quite ripe?



spongy
tissue cells of testa



x 150
cells
of Endosperm

GEORGE ENGELMANN HERBARIUM
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	Feb.	Mar.	Ap'l.	May.	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Mean of Year.	
1861	32.2	40.4	44.8	58.1	64.1	76.9	77.5	78.6	69.1	57.9	46.0	39.7	57.1°F.
1862	23.9	30.2	43.2	55.0	69.7	75.1	81.2	80.7	72.1	57.3	42.6	41.3	56.4°F.

RELATIVE HUMIDITY.

	Jan.	Feb.	Mar.	Ap'l.	May.	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Mean of Year.
1861	72.2	63.3	64.5	61.5	66.3	70.8	66.3	69.6	77.3	76.6	69.0	74.3	69.5
1862	85.3	73.9	70.8	67.0	57.3	67.0	66.8	64.3	74.2	67.2	69.5	74.6	69.8

III. Yearly mean of Positive Electricity of Temperature, and of Relative Humidity of the Atmosphere, at the hours of 6, 9, 12, 3, 6 and 9, from morning till night, based upon daily observations at these hours through the years 1861 and 1862, at St. Louis, Mo.

ELECTRICITY.

	At 6 A.M.	At 9 A.M.	At 12 M.	At 3 P.M.	At 6 P.M.	At 9 P.M.
1861	8.6	10.0	9.2	7.9	8.7	6.9
1862	8.9	10.0	9.1	7.3	8.1	6.8

TEMPERATURE.

1861	48.9° F.	54.9	61.6	63.6	59.3	54.3
1862	48.9	55.0	60.9	62.3	58.0	53.6
1861	86.4	71.3	60.3	57.2	65.1	77.3
1862	5.3	70.6	60.0	57.5	67.6	78.0

RELATIVE HUMIDITY.

1861	86.4	71.3	60.3	57.2	65.1	77.3
1862	5.3	70.6	60.0	57.5	67.6	78.0

L. polyrrhiza
 Collected by Henry Gillmann



0 1 2 3 4 5 6 7 8 9 10

cm

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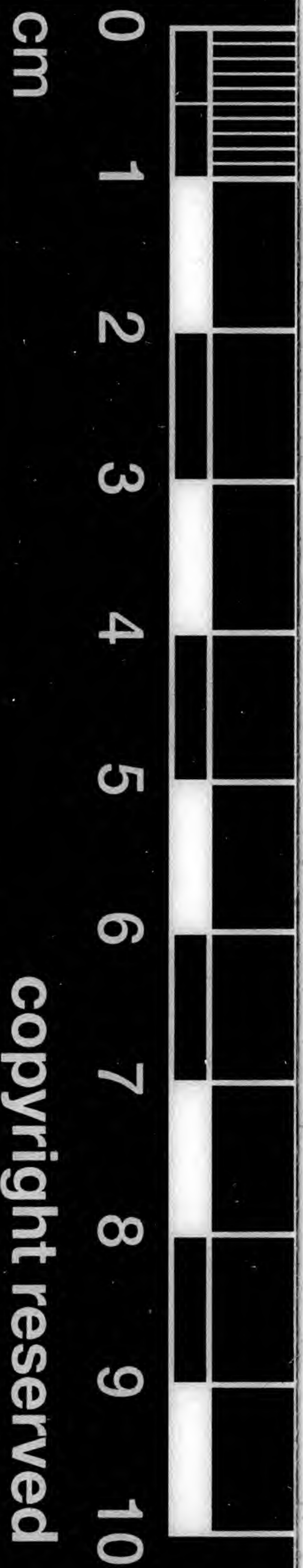
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V. Positive or Negative Electricity in the Observations of '61 & '62.

	Positive Electricity.		Negative Electricity.		No Electricity, or 0.		Highest Positive Electricity.	
	1861.	1862.	1861.	1862.	1861.	1862.	1861.	1862.
Jan.....	179	179	3	5		2	40°	40°
Feb.....	162	166	6	2			34	33
March...	168	179	15	8			30	48
April....	157	157	12	22	1	1	33	52
May.....	171	180	17	5	1	3	25	32
June....	162	143	5	2	8	20	16	21
July.....	183	153	3	8	1	24	14	11
August..	176	143	5	4	6	40	15	19
Sept.....	169	117	1	1	10	61	18	23
Oct.....	162	143	4	3	20	41	33	35
Nov.....	172	157	2	7	6	16	42	42
Dec.....	175	166	5	0	6	17	37	35
	2046	1883	78	67	59	225	42°	52°



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Feb. 40.4 30.2
 Feb. 63.3 73.9
 y m Hu
 frons t
 6 A. 8.6 8.9
 48.9 48.9
 86.4 5.3

L. Polyzkyja *Justiz*
G. Steiger in New York. *Ditrovic*

Fr. J. Schild. Aus dem Leberberg. Gedichte u. Sagen in Solothurner Mundart. 2 Bdchn. 1. Bdchn. 0.50; 2. Bdchn. 0.70

— Der Großätti aus dem Leberberg. Sammlung von Volks- u. Kinderliedern, Spottreimen, Sprichwörtern, Wetter- u. Gesundheitsregeln aus dem Solothurner Leberberg. 0.65

— Juraklänge in Solothurner Mundart. Vermischt mit einzeln. hochdeutsch. Gedichten. 0.45

A. Schirmer. Düt un dat. Nimens. Cart. 1.20

A. Schleicher. Volksthümliches aus Sonneberg im meiningen Oberlande. 1.99

Schlesische Volkslieder m. Melodien. Aus dem Munde des Volkes gesammelt u. hrsg. v. Hoffmann v. Fallersleben u. E. Richter. 4 Piefgn. 2.60

J. A. Schmeller. Die Mundarten Bayerns. grammatisch dargestellt. Beigegeben ist eine Sammlung von Mundart = Proben, d. i. kleinen Erzählungen, Gesprächen etc. in den verschiedenen Dialecten des Königreichs. 2.00

— Bayerisches Wörterbuch. Bearbeitet v. G. K. Frommann. 4. 1.—4. Liefer. @ 1.05

J. Sp. Schmid. Schwäbisches Wörterbuch m. etymolog. histor. Anmerkungen. 1.45

J. K. Schmid. 'S Kinischief'n vo Tölz 1855. Gedicht in oberbairischer Mundart. 0.15

J. H. Schmitz. Sitten u. Sagen, Lieder, Sprichwörter u. Räthsel des eifler Volkes, nebst e. Idiotikon. M. e. Nachrede v. R. Simrod. 2 Bde. 1.30

450 Schnadahüpfeln, oesterreicher G'sang'ln nebst Gefängen aus den Alpen-scenen „'s letzte Fensterln" u. s. w. 0.25

Fr. Schöniq. Glätische u. hochdeutsche Gedichte. Hrsg. v. Aug. Kastner. 0.75

J. B. Schöpf. Tirolisches Idiotikon. 5.20

Das Schöppmännchen bi Nordhusen. Aen Lobbgedichte in Nordhüscher Mundart zu sinnen 30-jährigen Jubeläum. 0.15

A. Schoffer. Naturbilder aus d. Leben der Gebirgsbewohner in den Grenzalpen zwischen Steyermark u. dem Traunkreise. Nach dort üblichen Arien und Liedern zusammengestellt. 1.20

— Nachgelassene Gedichte in der Volksmundart des Traunkreises. Sammt Lebensgeschichte d. Dichters und den oberöstr. Nationalmelodien zu allen Liedern. Hrsg. v. J. A. Schindler. 1.65

A. Schott. Die deutschen Colonien in Piemont, ihr Land, ihre Mundart u. Herkunft. Ein Beitrag zur Geschichte der Alpen. 2.50

A. Schreiber. Poetische Werke. (Das 7. Buch enthält Gedichte in schwäbischer Mundart sammt Idiotikon.) 2.60

W. Schröder. Heidsnucken. Plattbütsche spaßige Gedichten un Geschichten. 0.99

— Swinegels Reise nach Paris als Friedensstifter. Gene puzige plattbütsche Historje in tein Kapitteln. Mit sine Billers uutstafteert van L. Pöffler. 4. Cart. 1.20

— Jan Peik, de noordbütsche Spasmaeker. Sammlung plattdeutscher Humoresken, Gedichte, Schnurren u. Sprichwörter. M. 23 Holzschn. 0.50

— Swinegel's Lebensloop un Enne in'n Staate Nuffrika. Gene puzige plattbütsche Historje in dörtein Kapitteln mit Bildern. (S. a. Wettloopen.) 0.70

K. J. Schröer. Versuch einer Darstellung der deutschen Mundarten des ungarischen Berglandes m. Sprachproben u. Erläuter. 1.50

— Beiträge z. e. Wörterbuch der deutschen Mundarten d. ungar. Berglandes. 2. Abth. u. Nachtrag. 0.70

— Deutsche Weihnachtsspiele aus Ungarn, geschildert u. mitgetheilt. (Enthält viel Mundartliches.) 1.50

— Ein Ausflug nach Gottschee. Beitrag zur Erforschung der Gottscheewer Mundart. 0.90

J. K. Schuller. Gedichte in siebenbürgisch-sächsischer Mundart. Gesammelt u. erläutert. 1.00

— Beiträge zu einem Wörterbuch der siebenbürgisch-sächsischen Mundart. 0.90

— Zur Kunde siebenbürgisch-sächsischer Spotnamen u. Schelten. 0.20

G. Schultheiß. Hesel's Leben. Eine Idylle in des Schwarzwalds alemannischer Mundart. 0.40

Schulze und Müller in Teplitz. Eine abenteuerliche Badereise. (Theils in Berliner Mundart.) M. 40 Illustr. v. Reinhardt. 0.50

— in den rheinischen Bädern Ems, Schwabach, Wiesbaden, Frankfurt, Nauheim, Heideberg, Baden-Baden. Humorist. Reisebilder. (Theils in Berliner Mundart.) M. 43 Illustr. v. W. Scholz. 0.54

— am Rhein. Humoristische Reisebilder von Cöln bis Mainz. (Theils in Berliner Mundart.) M. 44 Illustr. v. W. Scholz. 0.50

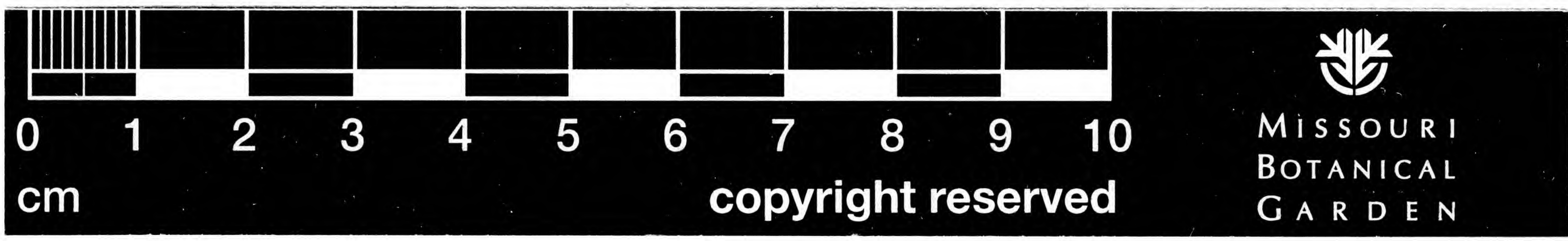
— auf der Pariser Weltausstellung 1857. (Theils in Berliner Mundart.) M. Illustr. v. W. Scholz. 4 Bdchn. @ 0.25

— in Amerika. (Theils in Berliner Mundart.) M. 50 Illustr. v. W. Scholz. 0.50

— auf Helgoland und in Hamburg. Abenteuer zu Wasser und zu Land. (Theils in Berliner Mundart.) M. 40 Illustr. v. E. Reinhardt. 0.50

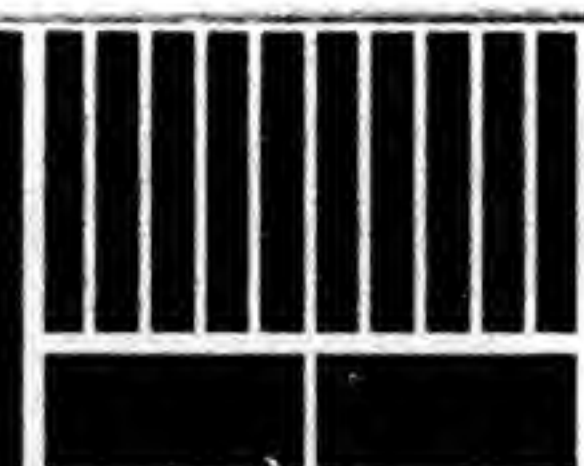
1871

1876



C. Steiger in New York.

- Schulze und Müller im Harz.** Humoristische Reisebilder. (Theils in Berliner Mundart.) M. 30 Illustr. v. W. Scholz. 0.50
 — in Dresden und in der sächsischen Schweiz. Humor. Reisebilder. (Theils in Berliner Mundart.) M. 50 Illustr. v. E. Reinhardt. 0.50
 — in Dänemark und Schweden. Humorist. Reisebilder. (Theils in Berliner Mundart.) M. 48 Illustr. v. W. Scholz. 0.50
 — in Constantinopel. Humoristische Reisebilder. (Theils in Berliner Mundart.) Illustr. v. Arn. Neumann. 0.50
 — auf einer Vergnügungs-Extrafahrt um die Welt à la Louis Stangen. (Theils in Berliner Mundart.) M. Illustr. 0.50
 — auf dem Kriegsschauplatz (1866). Zwanglose Hefte in drangvoller Zeit. (Theils in Berliner Mundart.) 4 Hefte m. 40 Illustr. v. W. Scholz. @ 0.25
 — 1870. (Theils in Berliner Mundart.) M. Illustr. v. W. Scholz u. A. 1 Hefte. 0.25
 — Kalender für 1871. Hrsg. v. d. Gelehrten des „Kladderadatsch“. (Theils in Berliner Mundart.) M. Illustr. v. W. Scholz, L. Köppler u. H. Scherenberg. 0.45
Die Schultheißenwahl zu Blindheim, oder: Ist das Volk mündig? Schauspiel in 3 Akt. v. Verf. d. Schulmeisterwahl in Blindheim. (In schwäb. Mundart.) 0.30
F. W. Schuster. Siebenbürgisch = sächsische Volkslieder, Sprichwörter, Räthsel, Zauberformeln u. Kinderdichtungen. M. Anmerkungen u. Abhandlungen. 3.40
Der Schwäbische Michel als Allerwelts-Spazmacher. Sammlung der beliebtesten Gedichte u. Erzählungen in schwäbischer Mundart. 0.65
Schwäbische Volkslieder m. ausgewählten Melodien. Aus mündl. Ueberlieg. gesamm. v. E. Meier. 1.95
Schwäbische Gedichte. Beitrag zur Sitte u. Mundart des schwäbischen Volkes. 1.00
Allgemeines Schweizer Liederbuch. Eine Sammlung 720 von der beliebtesten Gesänge, Nühreihen u. Volkslieder. 0.85
Der Schweizer Deklamator. Eine Sammlung heiterer u. ernster Vorträge in schweizerischen Mundarten. 2 Bde. 1.0)
 1. Bdchn. enthaltend Vorträge in Berner, Züricher, Appenzeller, Urner, Sarganser, Solothurner, Glarner, Luzerner, Unterwaldener u. Aargauer Mundart. 0.50
 2. Bdchn. enth. Vorträge in Basler, Luzerner, Solothurner, Aargauer, St. Gallener, Züricher u. Berner Mundart. 0.50
F. Schwerin. Der Altmärker. Sprichwörter, plattdeutsch auf Manier ausgelegt; nebst einigen schen Gedichten.
 — Vögel-Sproak un Enack, v Vögel klein u. groß im Frühjah mark singen u. sagen. In Reimverse gebracht.
J. G. Seidl. Almer. Inne Volksweisen. 3 Hefte.
 — Gedichte in niederösterreichischer Mundart. Gesammtausgabe. 2.25
A. Seyfried. Altboarische G'schichtn u. G'sangln. Cart. 0.65
S. Skutsch. Bibliotheca Silesiaca. Systematisch geordn. Verzeichn. e. reichh. Sammlung v. Büchern aus d. Gebiete d. schlesischer Literatur. 0.24
Smelzkop. Immen. M. Titelvign. (Braunschweiger Mundart.) 1.5
 — Schuppenstibdesche Streiche in E-dur u Fis-moll for hoch- un deepnäsige Lue. Gedichte. (Braunschweiger Mundart.) 0.5
 — Dwer da kunst jesunt te fin. 0.3
Snörken un Humörken. Plattdütsche N mels vun mi sülvst. 1.0
So spräten de norddütsche Bu'rn. Rööden varten, Sprichwuo'r, Bu'rvöäthsel, Niem un Singsang van de Gvörn. 0.
Dat Spook. Eine Geschichte aus dem Volk leben in der Mundart der Elbinger Hö 0.
F. J. Stalder. Die Landessprachen Schweiz oder schweizerische Dialektologie krit. Sprachbemerkungen beleuchtet. N der Gleichnißrede vom verlorenen Sohn allen Schweizermundarten. 3
W. Stein. Us'm Neckerdhal. Gedichte schwäbischer Mundart. Cart.
Fr. Stelzhammer. Gedichte in obderens' Volksmundart. 1. Thl. 1.50; 2. Thl. 1.50
 — 3. Thl. A. u. d. T.: D'Ähnl. Ged in obderens'cher Volksmundart. 0.
 — Politische Volkslieder. (In oberöst Mundart.) 0.
Steirische Banern-G'spoak u. Moane Doa g'schichtn, dazählt v. Ferd. Puff. 1. Büaa 0.
G. Stieler. Bergbleamln. Gedichte in ober bayrischer Mundart. geb. 1.3
Aug. Stöber. Elsässisches Volksbüchlein. Kinder- und Volksliedchen, Spielreime, Sprüche u. Märchen. 0.70
 — Oberrheinische Sagen u. Volkslieder. 1. u. 2. Hefte. M. 2 Kupfertaf. 0.80
F. Stolze. Gedichte in Frankfurter Mundart. 1.70



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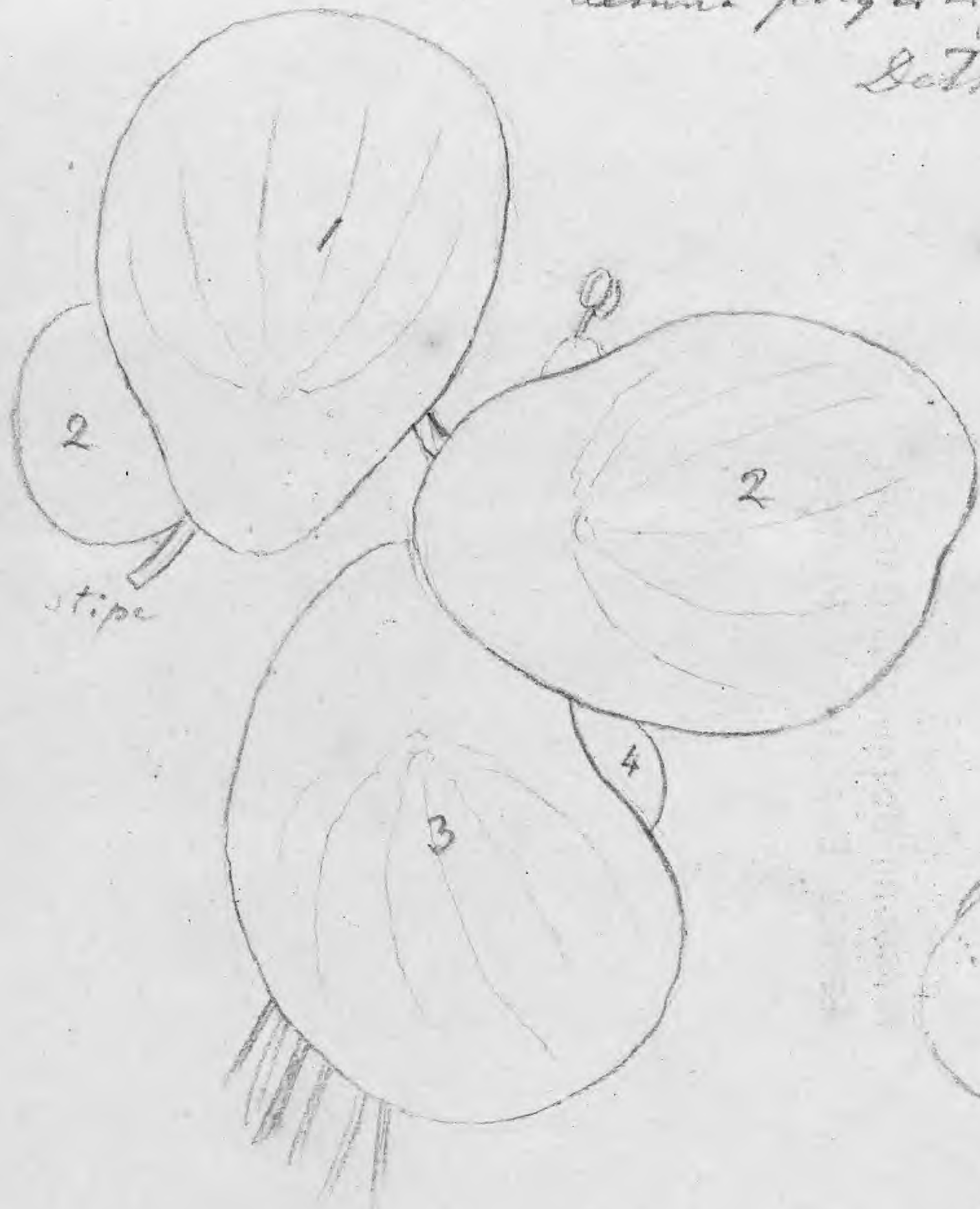
Senecio polylobus

Aug 9 1871

Detroit

Henry Gillman

X10



flower bud

figure X60

same day with 2 ovules



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Druggist & Chemist.
 S. E. COR. 6TH & WASHINGTON AVE.
ST. LOUIS.

J. C. Wood.
Night Bell on Washington Ave.

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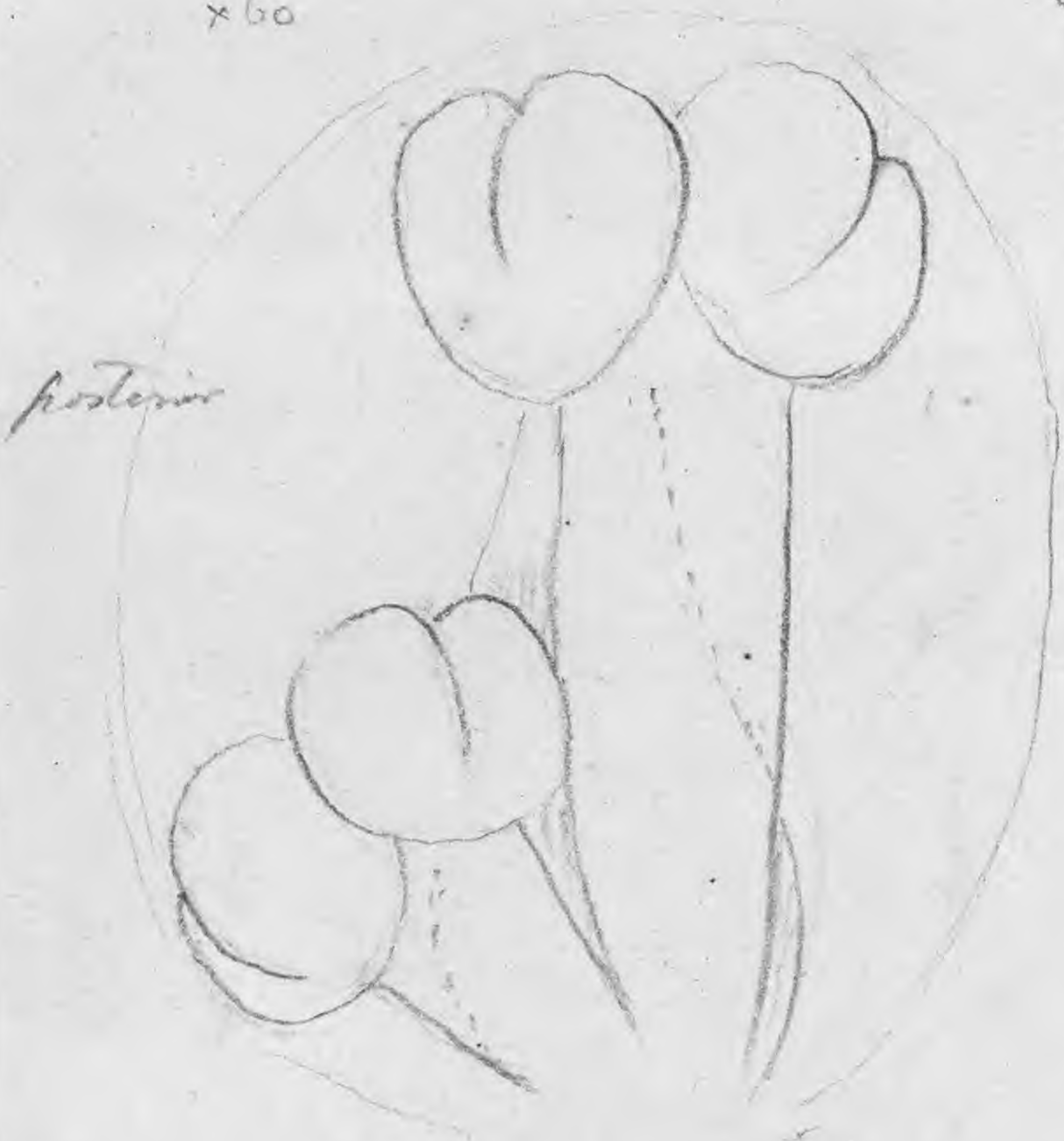
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Lemna polytricha
Detroit

Aug 9 1871

1871

x60



bud

anterior

x60

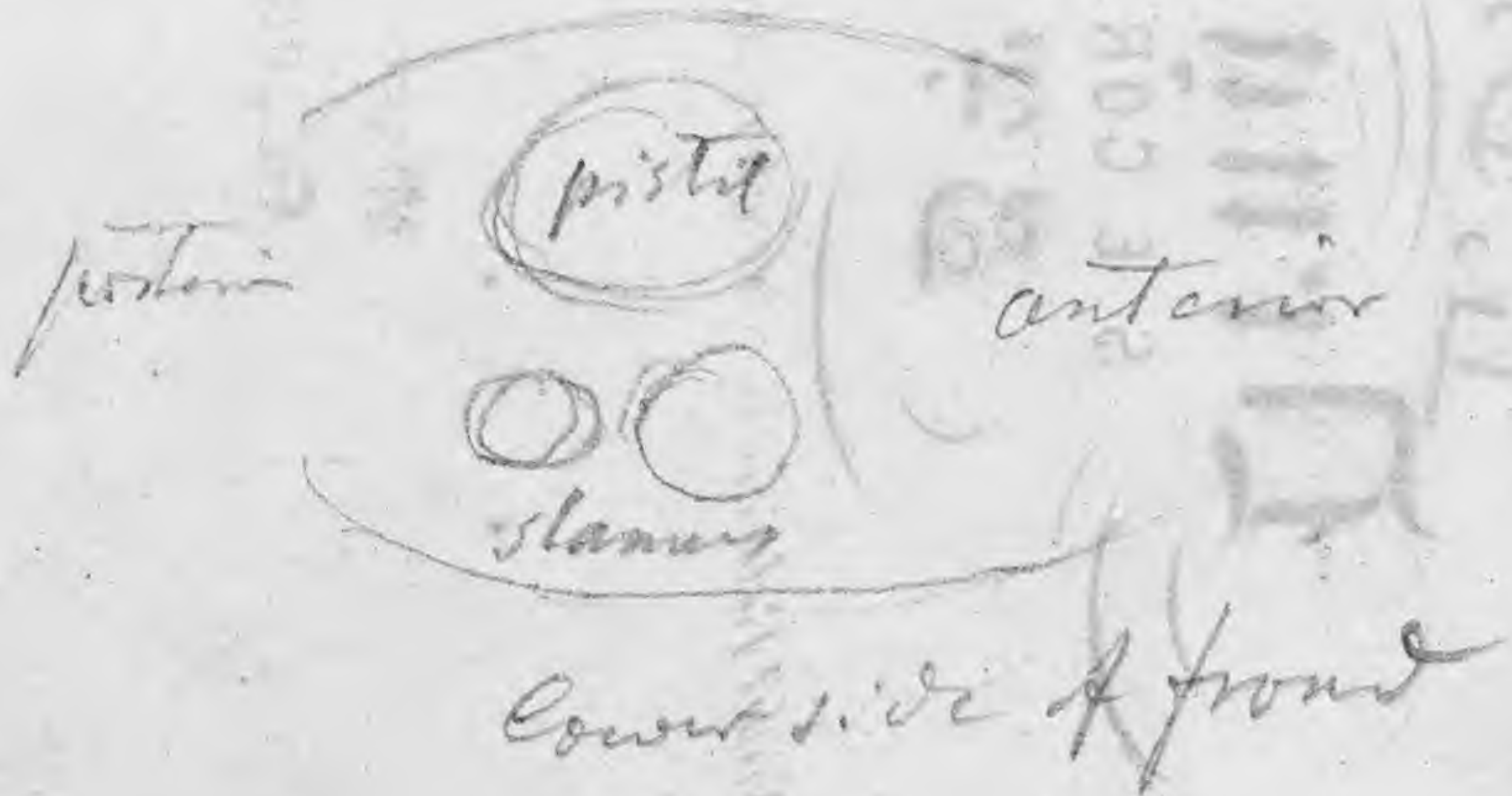


from below



spinescent Pollen

x415



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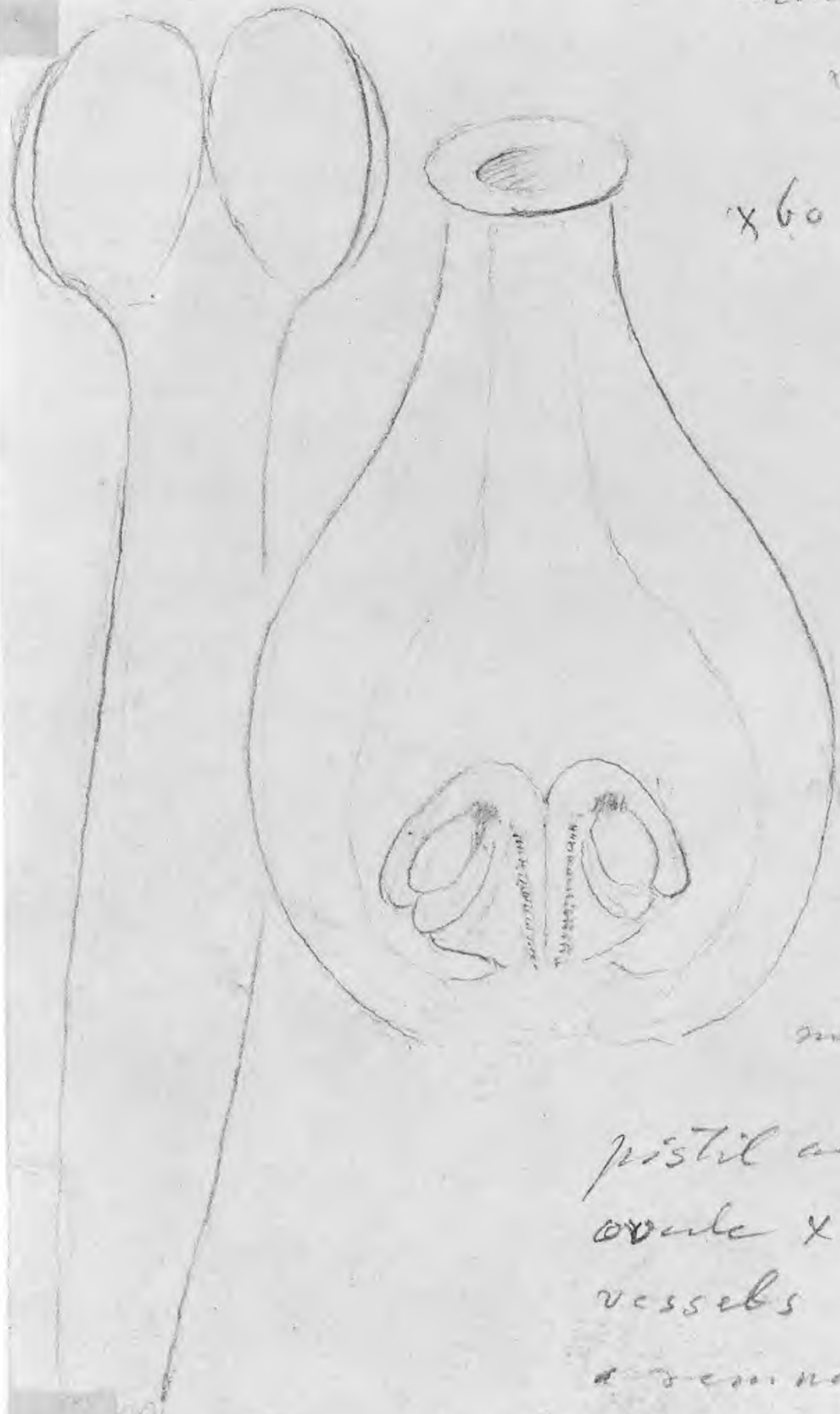
Leucina polytricha

Aug 27 1871

Detroit, H Gillman

x 60

x 150



one ovule probably smaller
not so well developed than the other - sterile?

pistil and anther after fertilization
ovule x 150 showing the very strong
vessels and also what seems to be
a remnant of the pollen tube

mature, effete, stamens only $\frac{100}{60} = 1.7$ mm long

(C. ...)
 ...
 ...
 ...
 ...



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Leitch & Corlies

DRUGGISTS

*South West
Corner Fifth
and Market
Streets.*

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Lesqueris polynorhiza
Detroit

Aug 27 1871

x150



ovule of the bud examined and
figured on Aug 9
made transparent
by Polak



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ROCKSWOOD

*Corner Fifth
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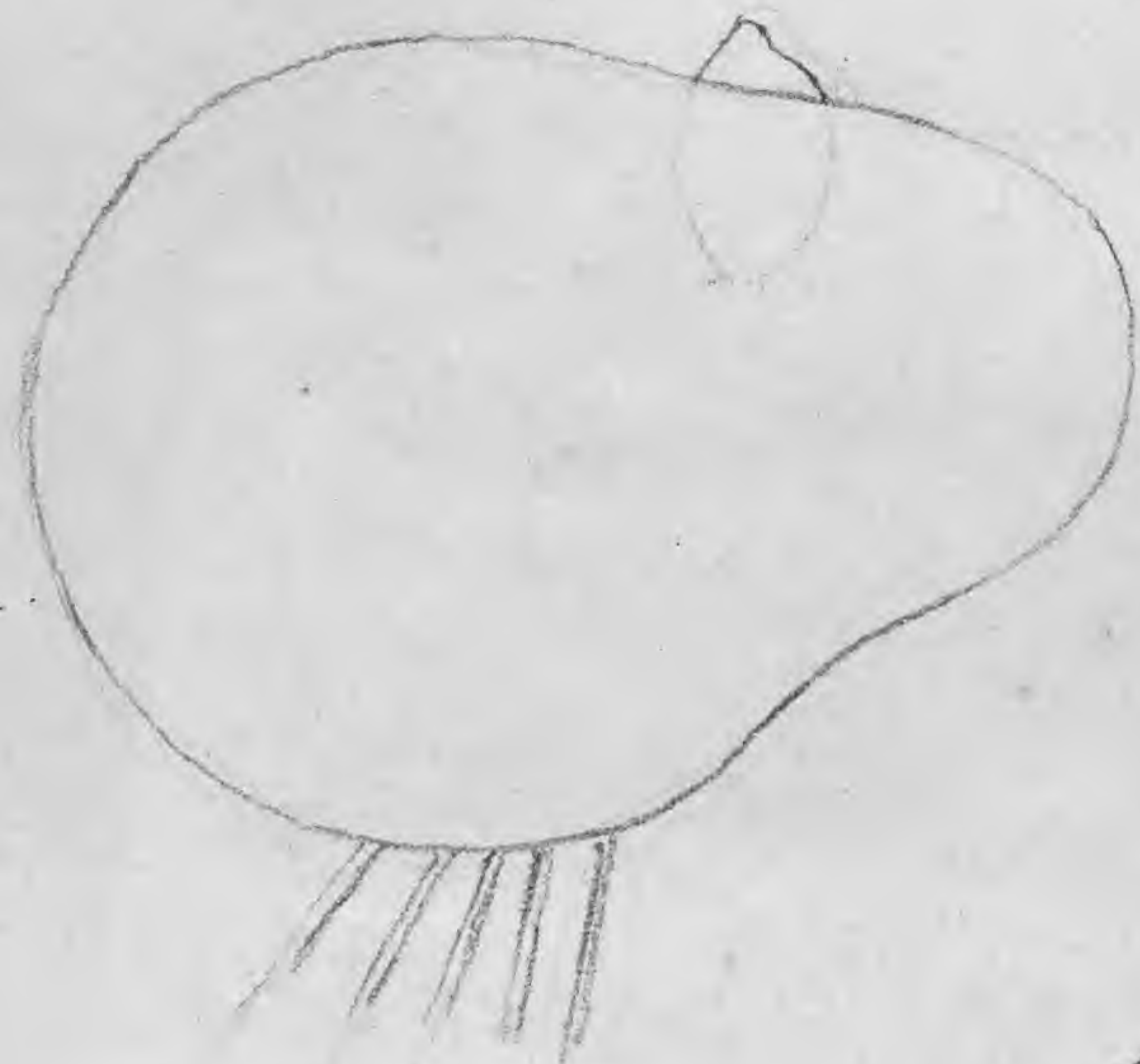
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L. polyrrhiza

Aug 28 1871

Dr. Covert

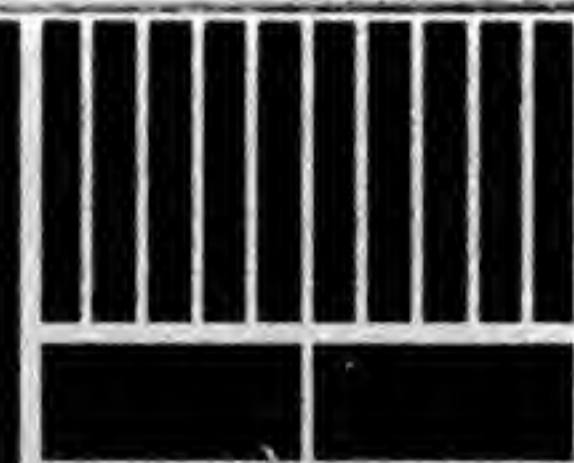
x10



x30



fruit immature, seeds apparently abortive!



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h & Corlies

RUGGERS'S

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FLORA OF MISSOURI.

F. W. DEWART.



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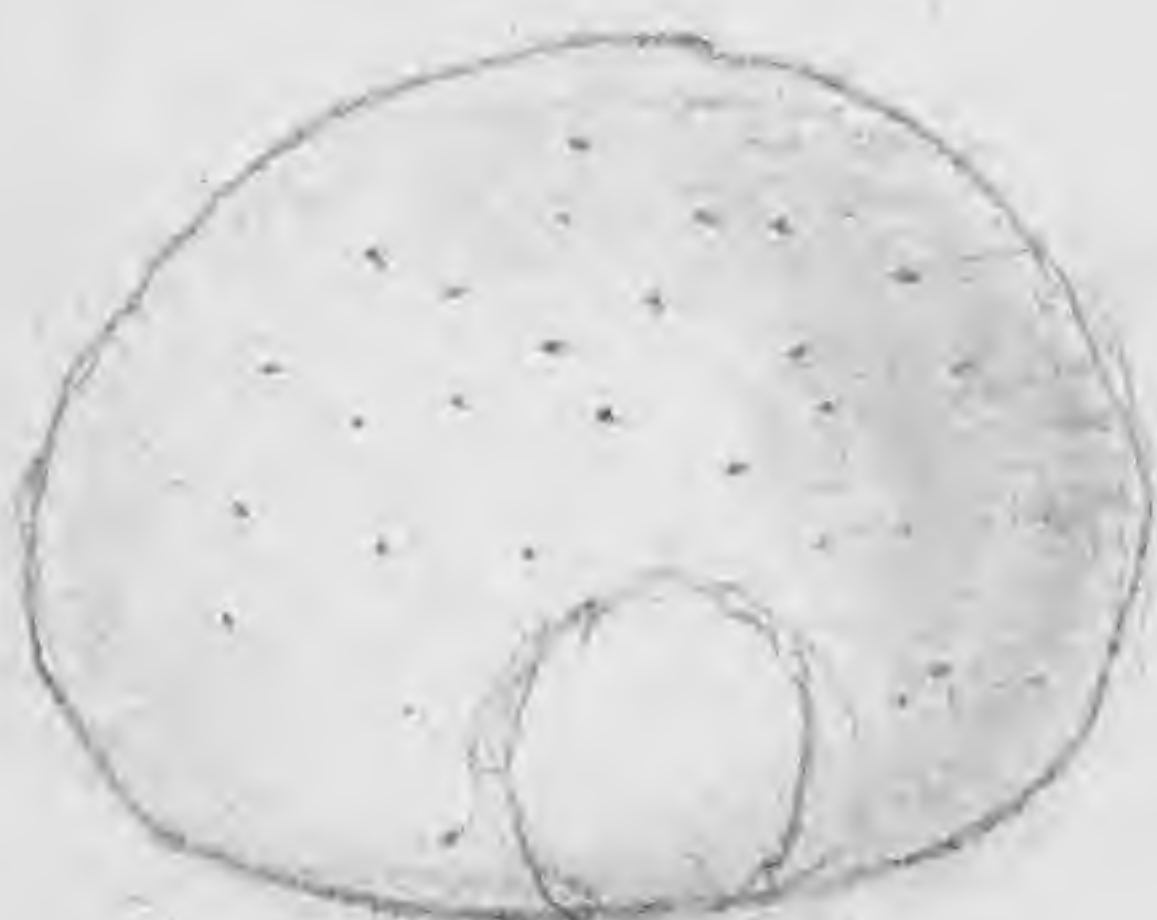
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Oct 21 1867

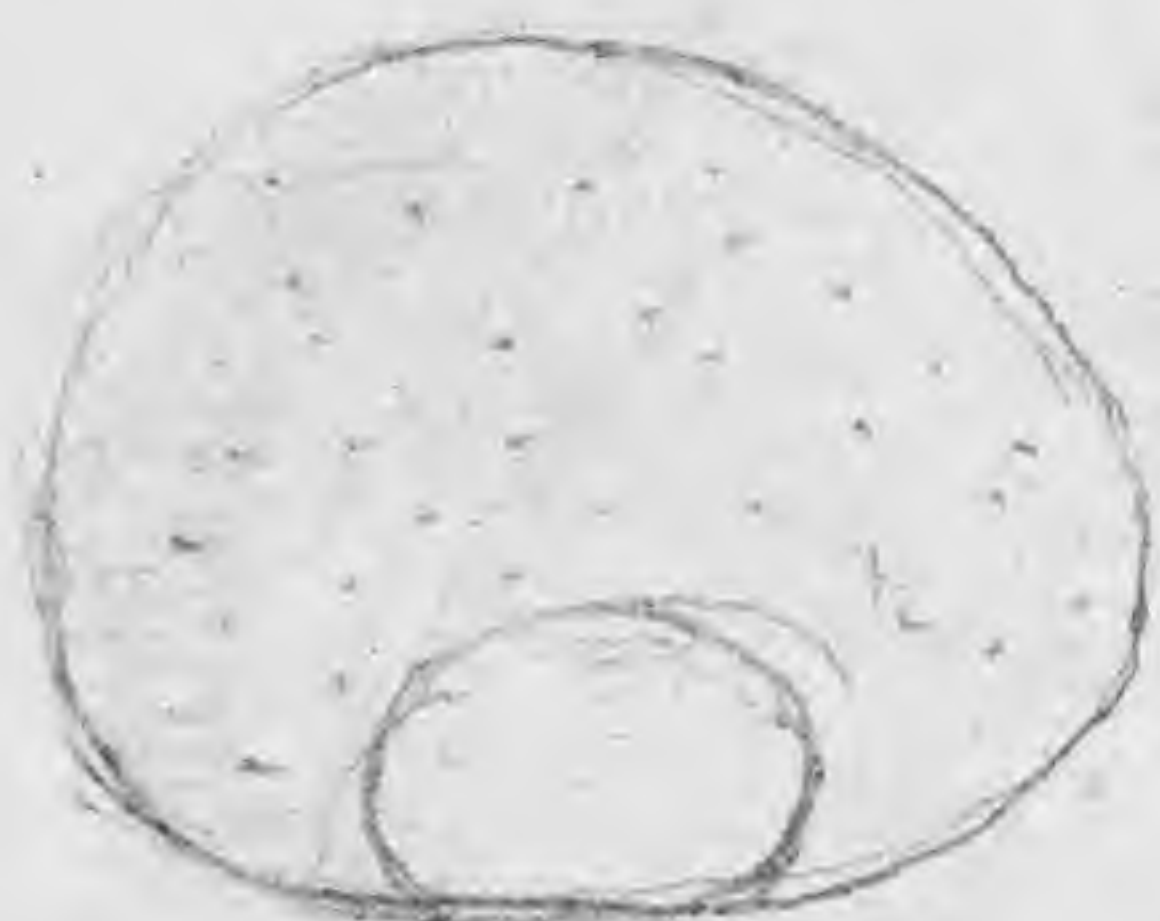
Lemna polyrrhiza
autumnal buds
E Hall's specimens

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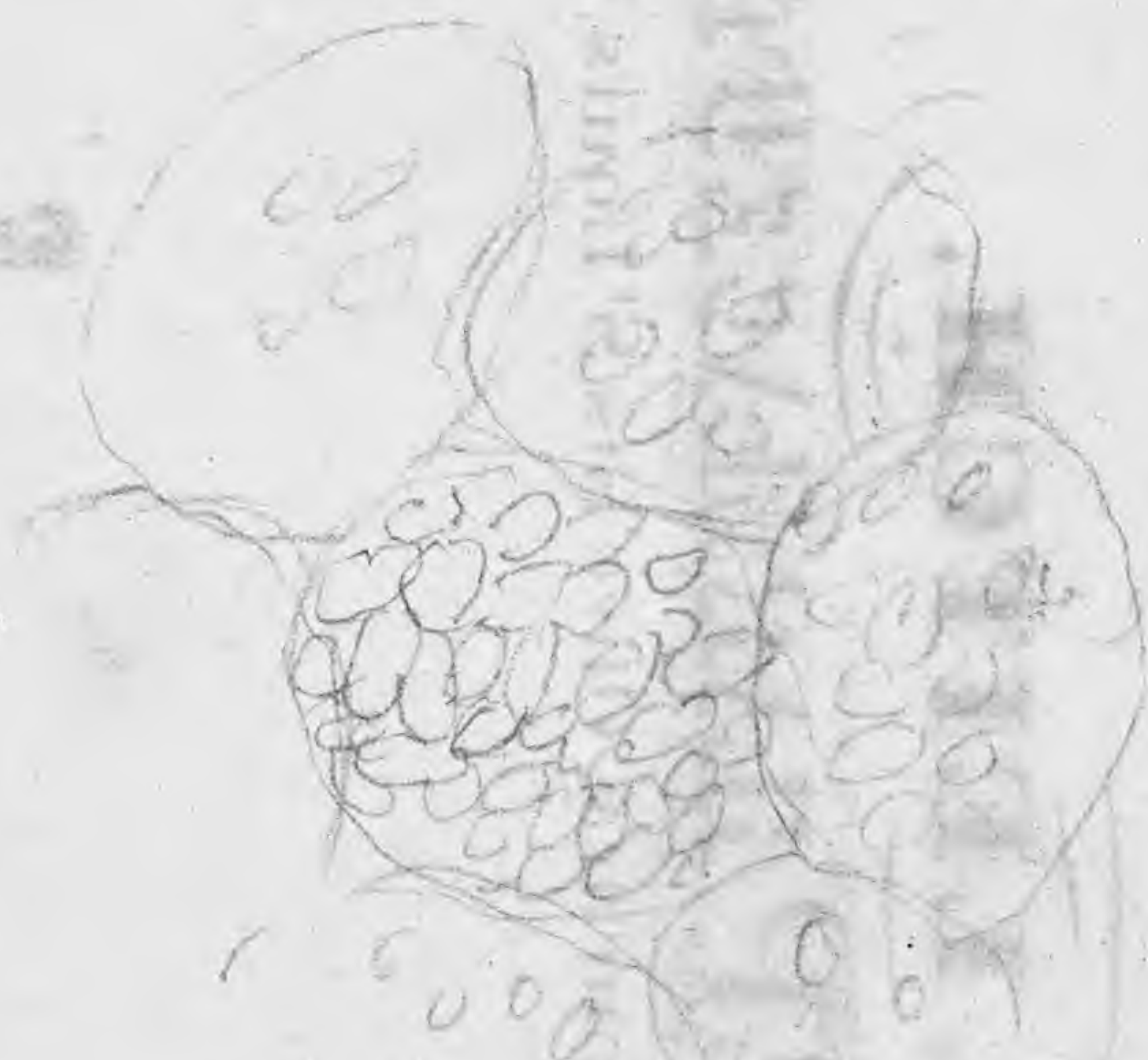
x10



convex
lower side

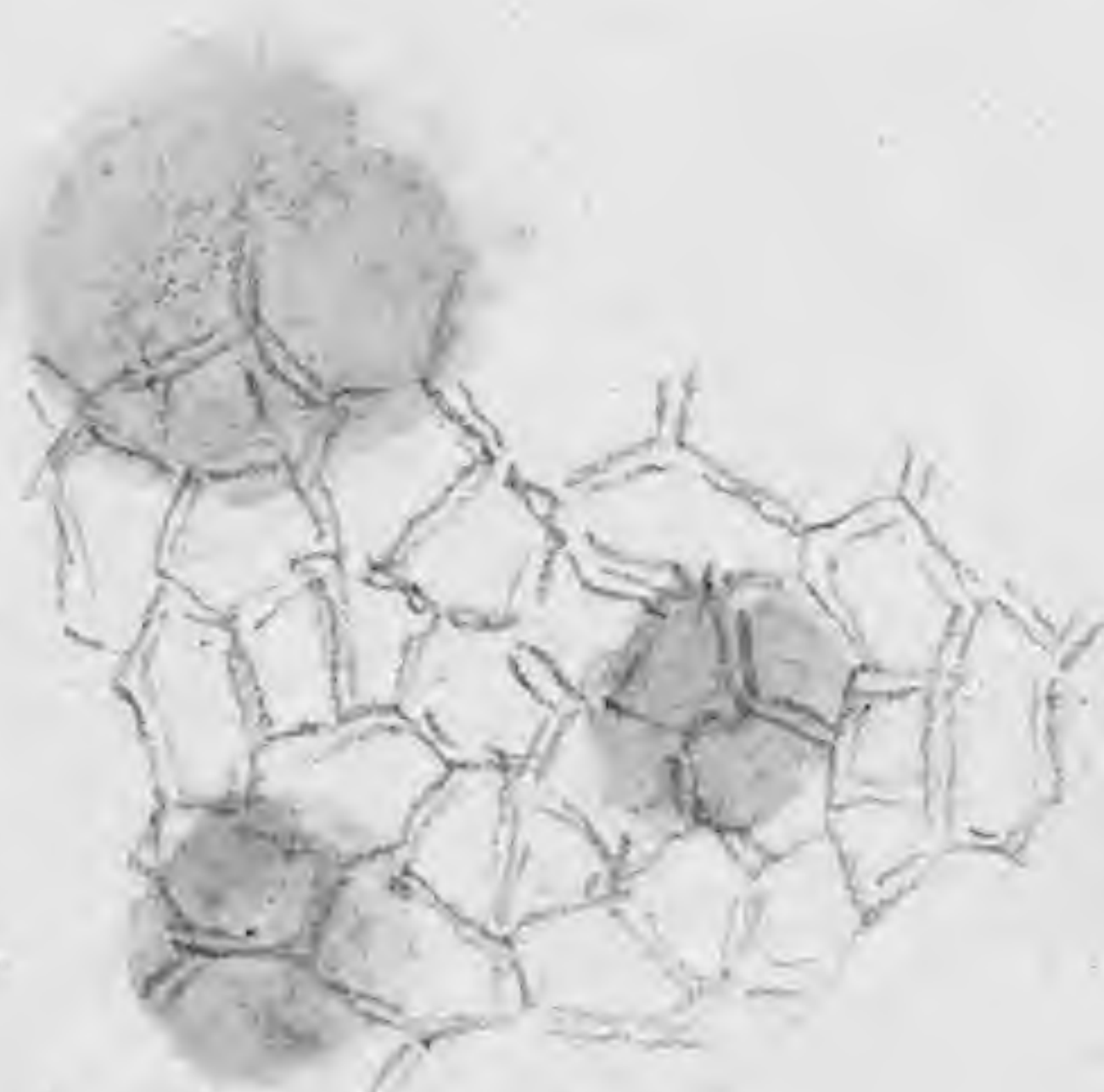
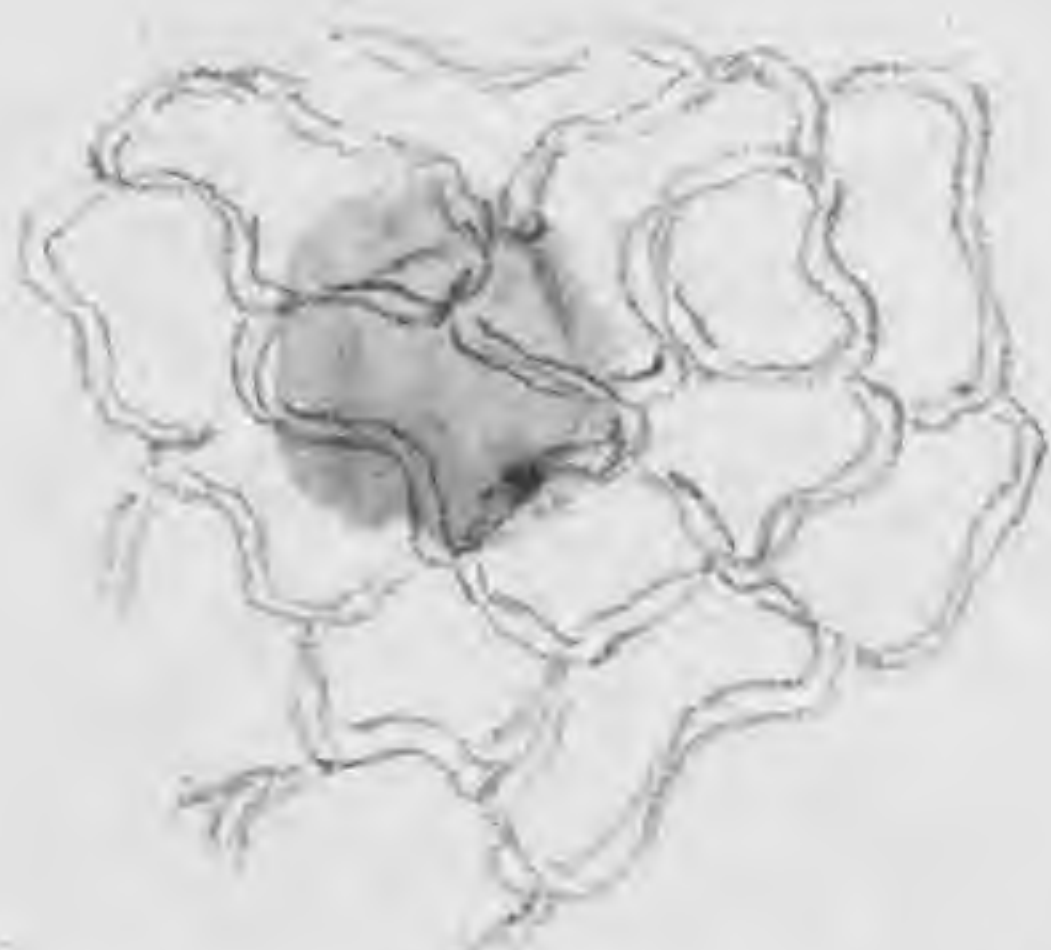


plane
upper side



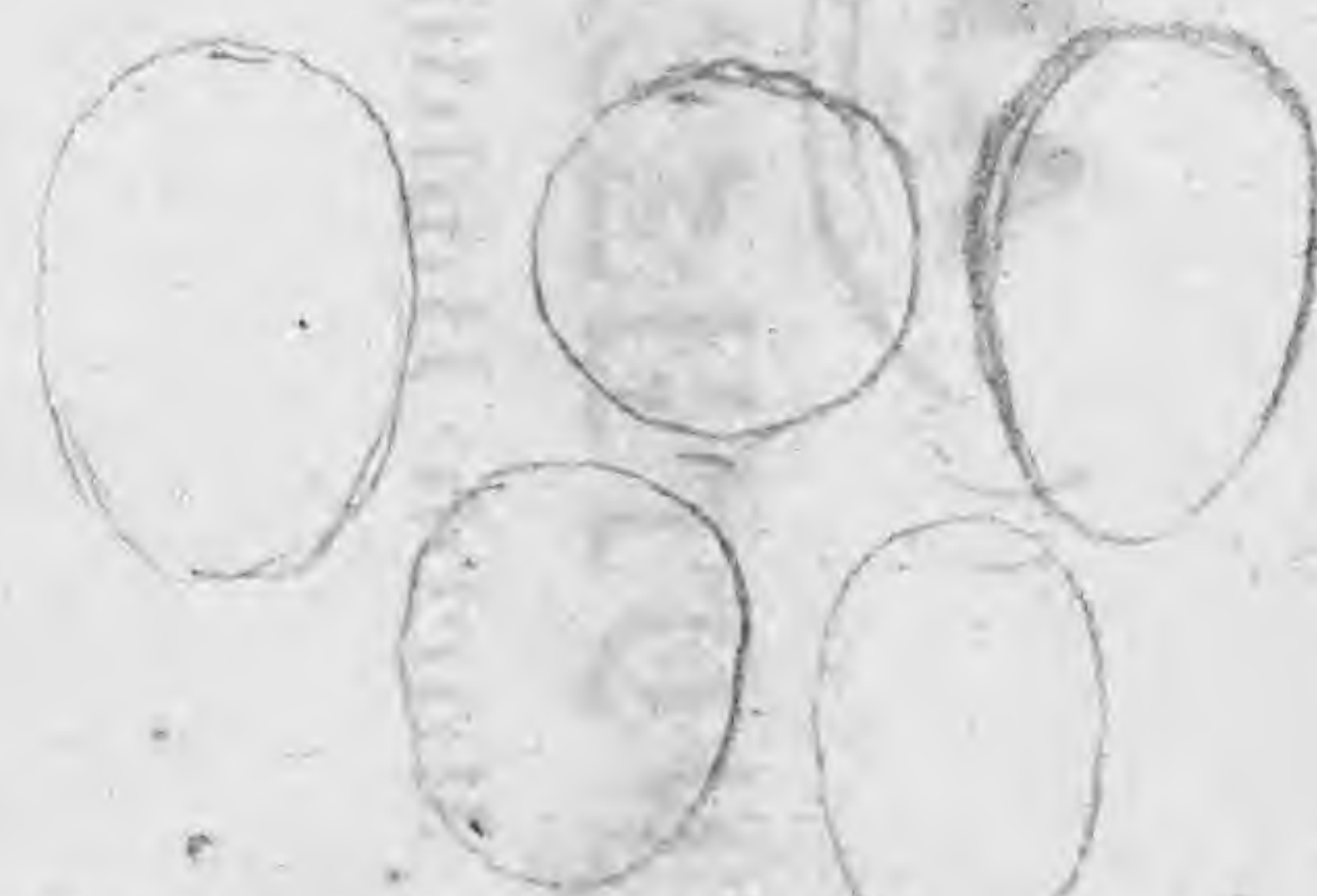
paracymbria cells
full of starch

x280



epidermis on different
parts of surface

brown cells under epidermis



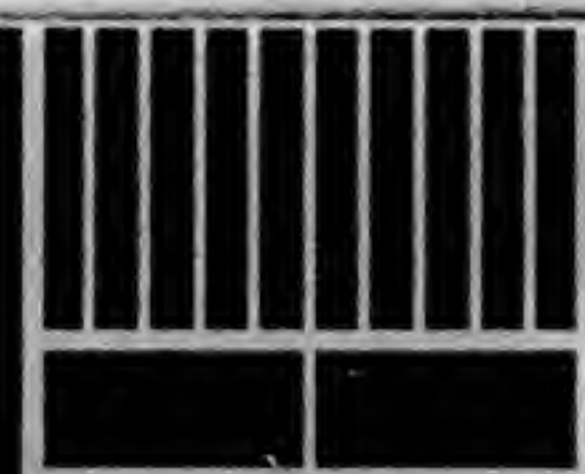
starch granules

x280



stomata small, surrounding cells
angular, others often somewhat
sinuous

x785



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Lemna polyrrhiza

Nov 10 1867

(living) autumnal bud

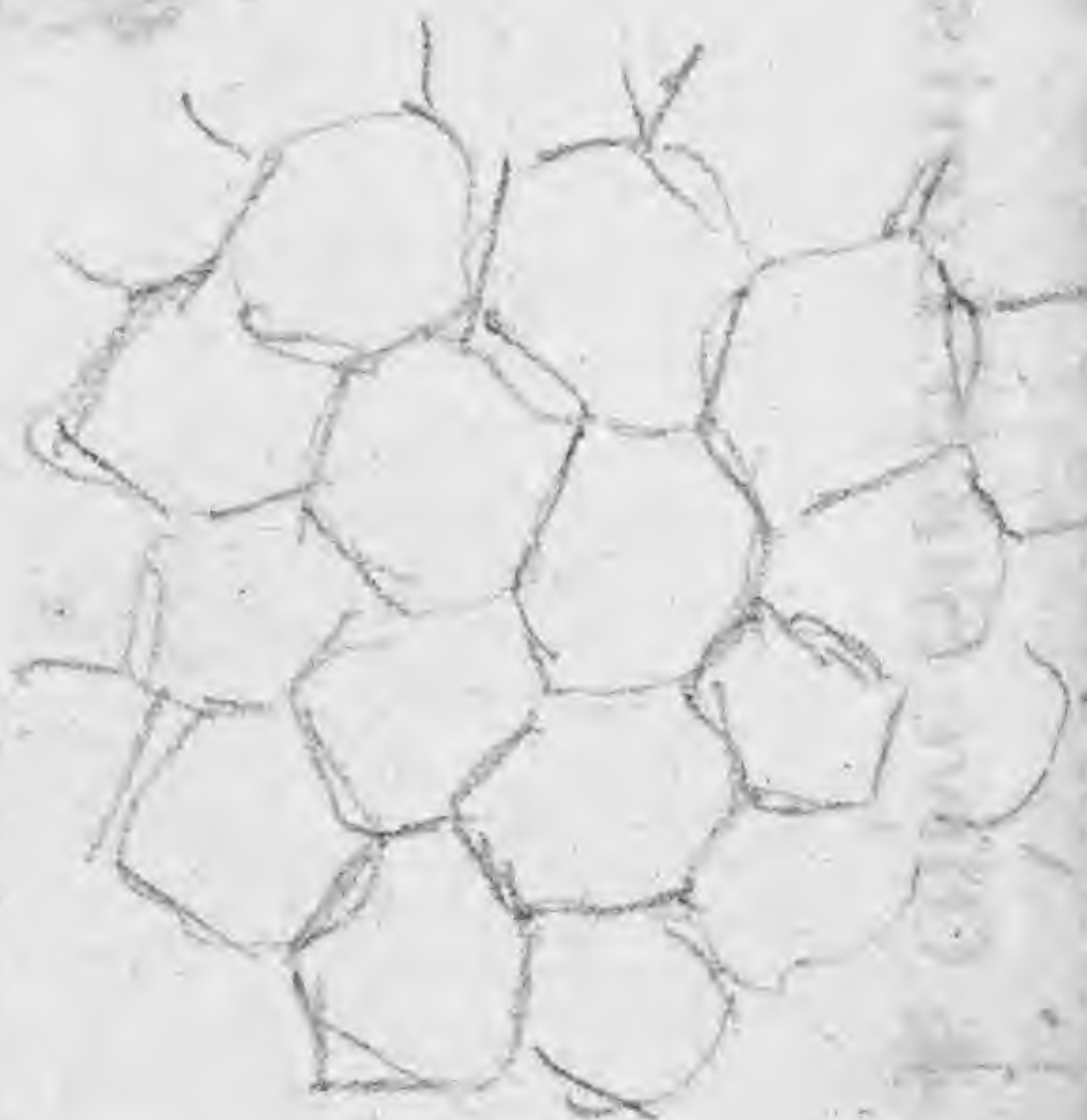
C. F. Austin's Nov 1867

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Upper flat green surface

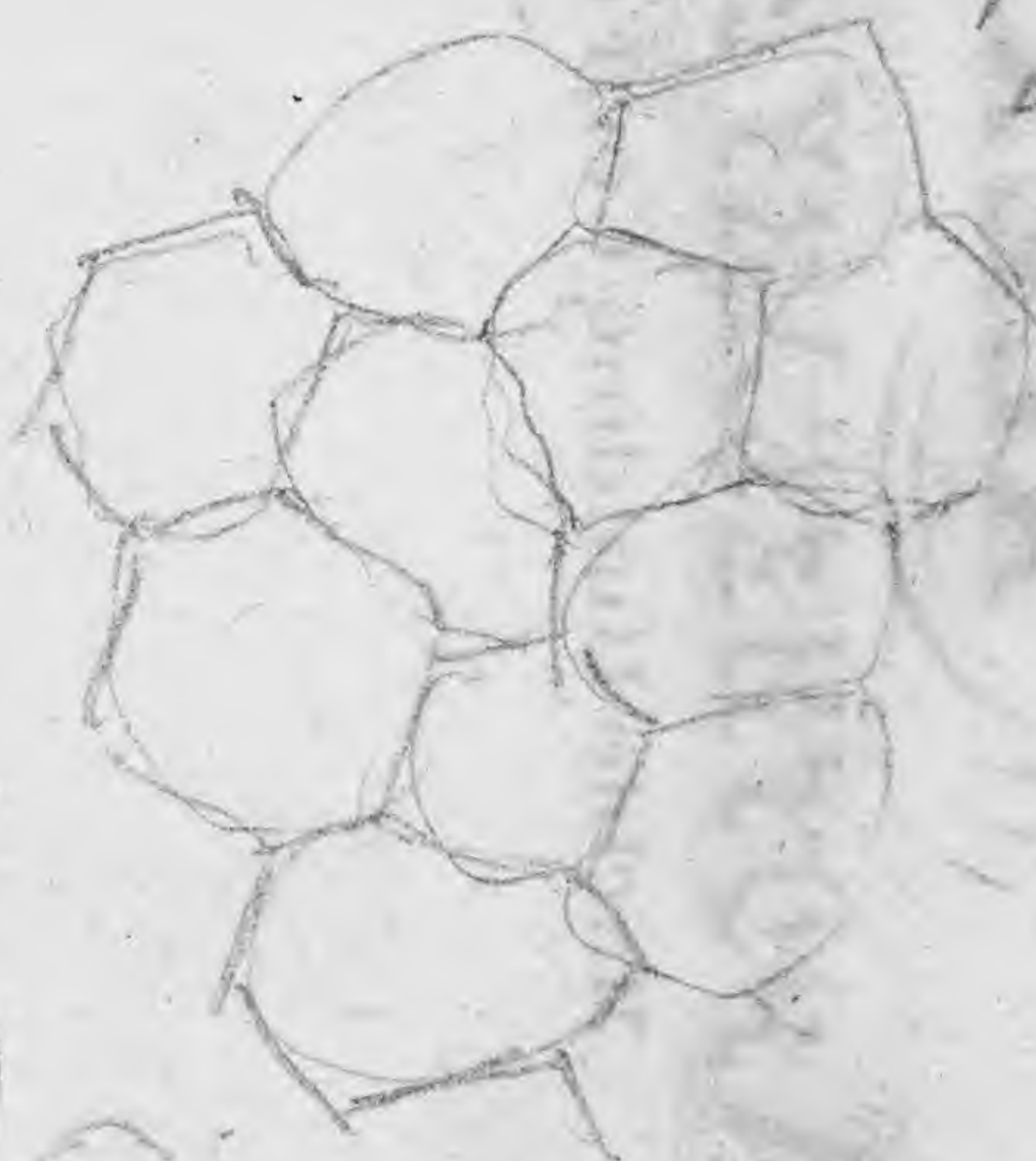
part with numerous stomata and small more angular cells



parenchyma under upper epidermis

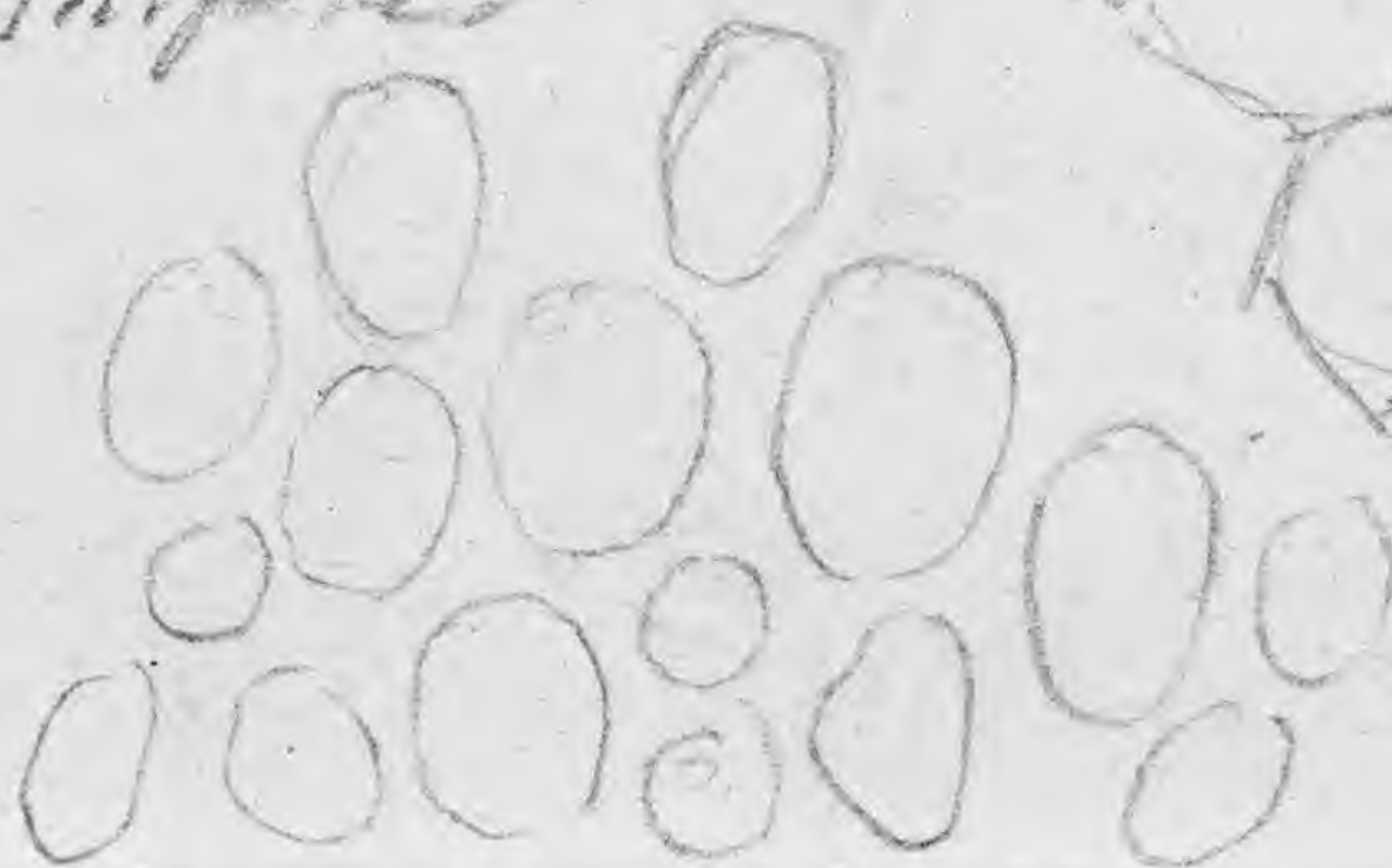
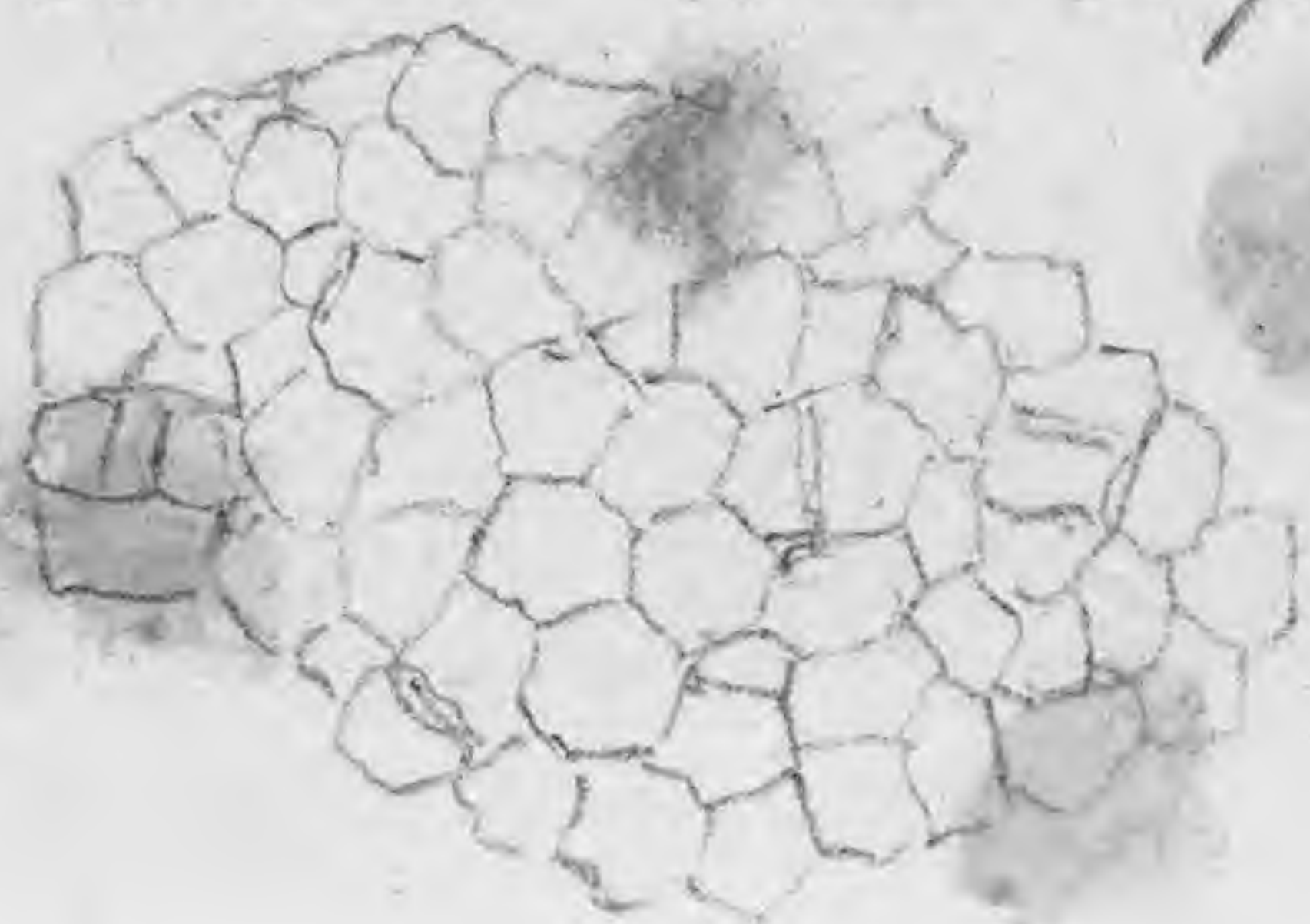
part with larger sinuous cells and no stomata

both treated with Potash



parenchyma under lower epidermis

Lower convex purple surface



Starch granules x 785



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